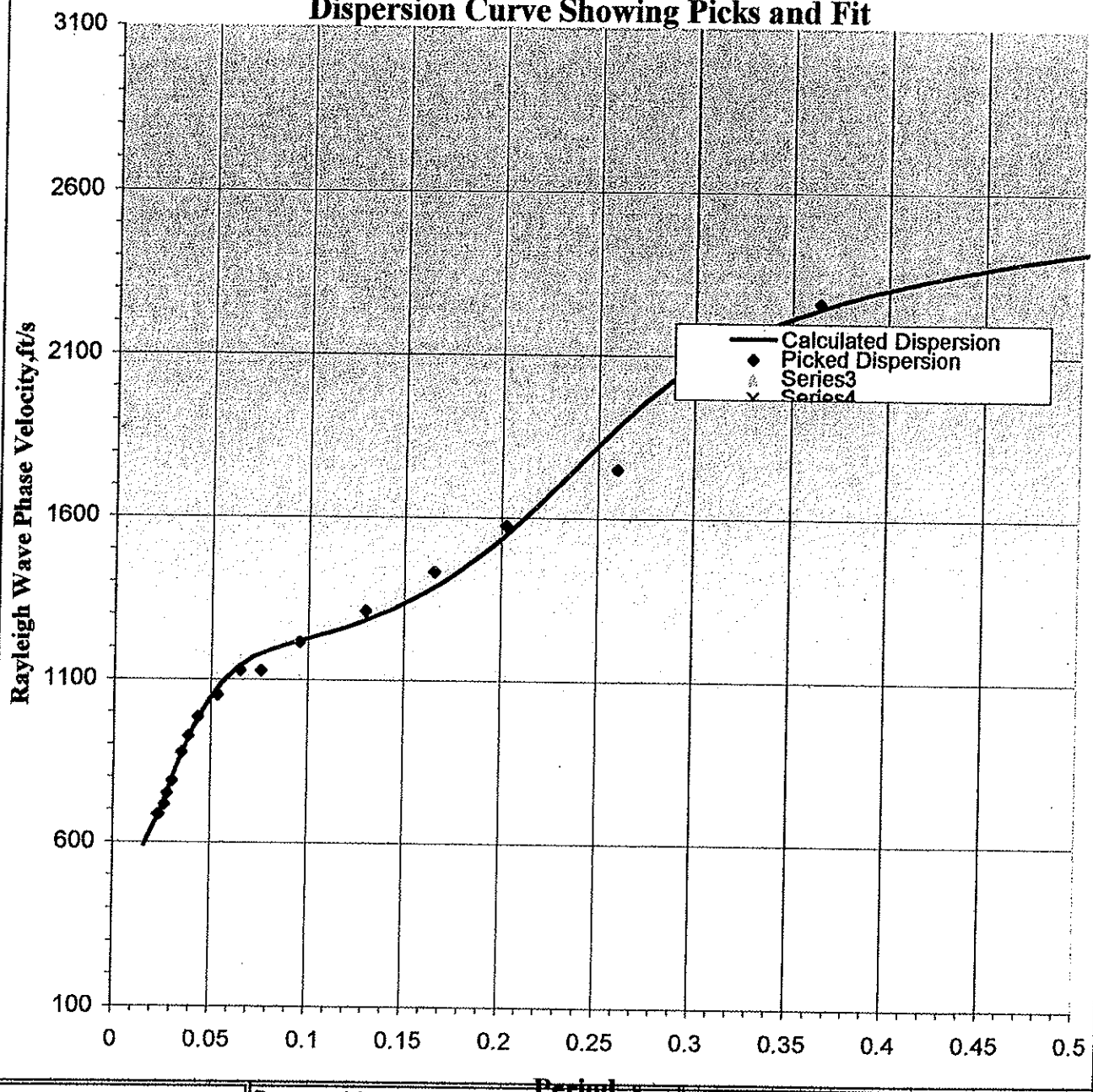
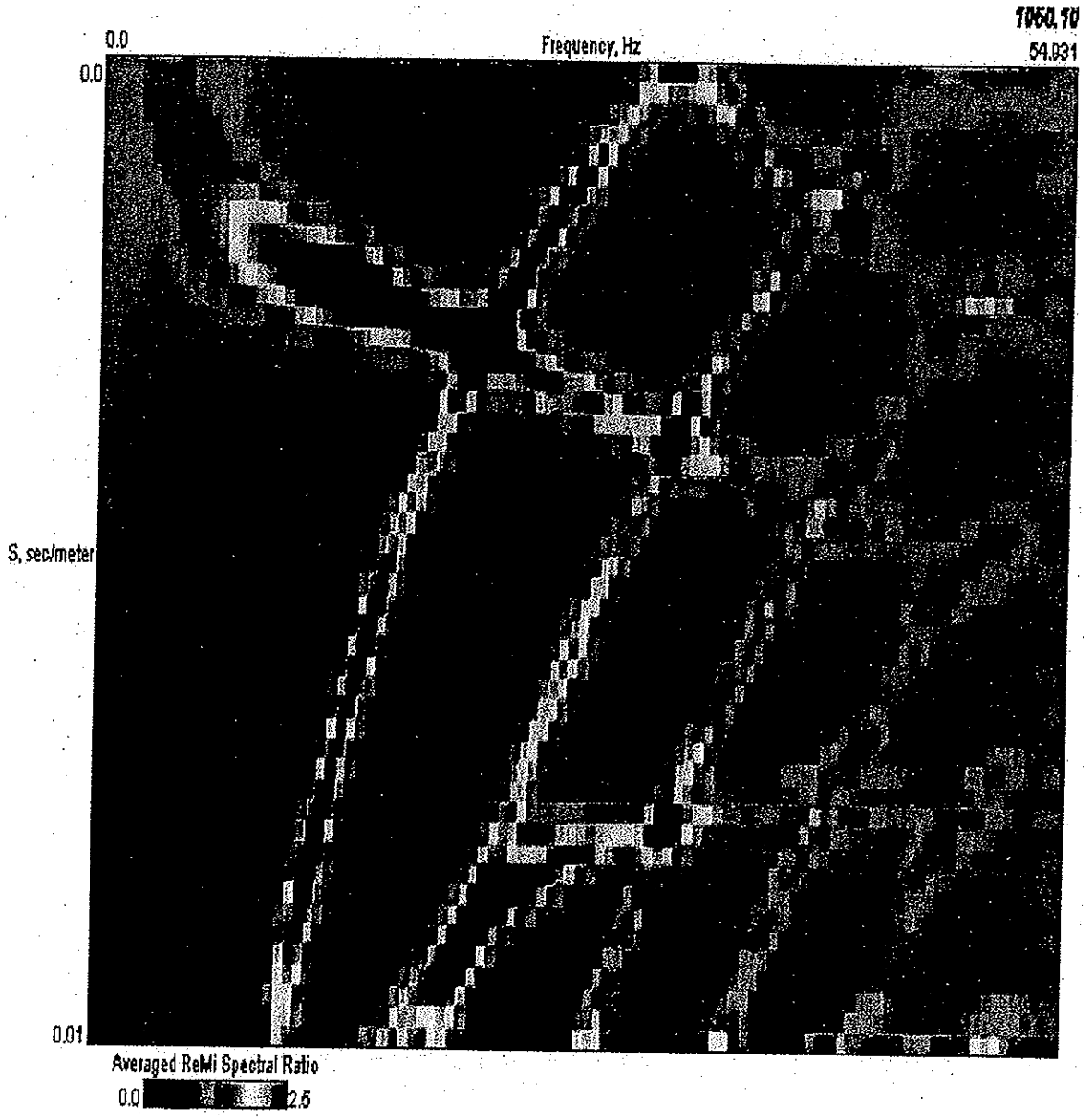
PN 1060.10: Supportive Illustration



AMERICAN SOILS ENGINEERING, LLC	**Prepared By:** American Soils Engineering, LLC 6000 South Eastern Ave., Suite 12E Las Vegas, NV 89119		**Project Name:** Golden Valley Ranch Mojave County, AZ
	Project No: PN: 1060-GEO	**Date:** 09-09-05	**Prepared For:** RHODES HOMES

p-f Image with Dispersion Modeling Picks



AMERICAN SOILS ENGINEERING, LLC	**Prepared By:** American Soils Engineering, LLC 6000 South Eastern Ave., Suite 12E Las Vegas, NV 89119		**Project Name:** Golden Valley Ranch Mojave County, AZ
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American Soils Engineering, LLC

Shear Wave Velocity Testing Procedure
Phase I (1500 ± acres) at Golden Valley Ranch
Located at Southwest Corner of Shinarump and Yuma Road
Mohave County, Arizona

American Soils Engineering, LLC performed shear-wave study on September 3, 2005 for the Phase I (1500 ± acres) at Golden Valley Ranch Located at Southwest Corner of Shinarump and Yuma Road Mohave County, Arizona. Our refraction microtremor (ReMi) surveys were performed total ten (10) lines, approximately location of the lines are shown in the Figure 1(enclosed appendix "C"). The data was processed using SeisOpt® ReMi™ (© Optim LLC, 2003) software to reveal one-dimensional average shear-wave (S-wave) velocity structure to a minimum depth of 100 feet and maximum depth of 170 feet. In addition, the survey also provides the average shear-wave velocity down to 100 feet (30 meters), or V_{30}, that can used for site classification studies. Data acquisition went very smoothly and the data quality was quite good. Analysis reveals that the average S-wave velocities in the upper 100 feet (Vs) were:

Line 1 is about 1,365 ft/s
Line 2 is about 1,309 ft/s
Line 3 is about 1,279 ft/s
Line 4 is about 1,434 ft/s
Line 5 is about 1,283 ft/s
Line 6 is about 1,378 ft/s
Line 7 is about 1,368 ft/s
Line 8 is about 1,329 ft/s
Line 9 is about 1,361 ft/s
Line 10 is about 1,309 ft/s

Project Description

The objective of this project was to determine one-dimensional shear-wave velocity structure down to a depth of at least 100 feet. The shear-wave profiling made use of the refraction microtremor method (Louie, 2001). In addition to the average velocity, down to 100 feet (V_s) that this would help determine, it also reveals depth to layered velocity structure beneath the profile.

Data Acquisition

The simplicity and speed of the data gathering process in the field is at the heart of the refraction microtremor (ReMi) method advantage. The method uses standard refraction seismic equipment to measure background 'noise' enhance by inducing background noise; in this case, by driving truck and walking and running up and down along the array as the records were recorded. The equipment used for the survey at both sites included a SeisDAQ ReMi recording unit capable of storing record length up to about 100 seconds and 12, 10 Hz vertical P-wave geophones. The ReMi analysis presented here was developed from the 12 receivers (10 Hz. geophones) set along a relatively straight-line array, with 25-foot receiver spacing for a total line length of 275 feet. Total ten (10) lines, only 12 geophones were used (total length of 275 feet) due to access restrictions. There is no need to survey in the geophone locations as long as the array is laid out relatively straight (less than 3% bend in the line) and the elevation change is less than 2% of the total length. Ten, unfiltered, 30-second "noise" records were recorded along each line.

American Soils Engineering, LLC

Shear Wave Velocity Testing Procedure
Phase I (1500 ± acres) at Golden Valley Ranch
Located at Southwest Corner of Shinarump and Yuma Road
Mohave County, Arizona

Data Processing

The noise records collected above were processed using the SeisOpt® ReMi™ software (© Optim LLC, 2005) that uses the refraction microtremor method (Louie, 2001). The refraction microtremor technique is based on two fundamental ideas. The first is that common seismic-refraction recording equipment, set out in a way almost identical to shallow P-wave refraction surveys, can effectively record surface waves at frequencies as low as 2 Hz. The second idea is that a simple, two-dimensional slowness-frequency (p-f) transform of a microtremor record can separate Rayleigh waves from other seismic arrivals, and allow recognition of true phase velocity against apparent velocities. Two essential factors that allow exploration equipment to record surface-wave velocity dispersion, with a minimum of field effort, are the use of a single geophone sensor at each channel, rather than a geophone "group array", and the use of a linear spread of 12 or more geophone sensor channels. Single geophones are the most commonly available type, and are typically used for refraction rather than reflection surveying. The advantages of ReMi from a seismic surveying point of view are several, including the following: It requires only standard refraction equipment already owned by most consultants and universities; it requires no triggered source of wave energy; and it will work best in a seismically noisy urban setting. Traffic and other vehicles, and possibly the wind responses of trees, buildings, and utility standards provide the surface waves this method analyzes.

For each site, there were three main processing steps:

Step 1:

Create a velocity spectrum (p-f image) from the noise data: The distinctive slope of dispersive waves is a real advantage of the p-f analysis. Other arrivals that appear in microtremor records, such as body waves and airwaves cannot have such a slope. The p-f spectral power image will show where such waves have significant energy. Even if most of the energy in a seismic record is a phase other than Rayleigh waves, the p-f analysis will separate that energy in the slowness-frequency plot away from the dispersion curves this technique interprets. By recording many channels, retaining complete vertical seismograms, and employing the p-f transform, this method can successfully analyze Rayleigh dispersion where SASW techniques cannot.

Step 2:

Rayleigh-wave dispersion picking: Picking is done along a ``lowest-velocity envelope" bounding the energy appearing in the p-f image. This ensures that the picks are representative of true velocities rather than apparent velocities, since noise is assumed to come from all directions. Picking a surface-wave dispersion curve along an envelope of the lowest phase velocities having high spectral ratio at each frequency has a further desirable effect. Since higher-mode Rayleigh waves have phase velocities above those of the fundamental mode, the refraction microtremor technique preferentially yields the fundamental-mode velocities. Higher modes may appear as separate dispersion trends on the p-f images, if they are nearly as energetic as the fundamental.

Spatial aliasing will contribute to artifacts in the slowness-frequency spectral-ratio images. The artifacts slope on the p-f images in a direction opposite to normal-mode dispersion. The p-tau transform is done in the space and time domain, however, so even the aliased frequencies preserve

some information. The seismic waves are not continuously harmonic, but arrive in-groups. Further, the refraction microtremor analysis has not just two seismograms, but 12 or more. So severe slowness wraparound does not occur until well above the spatial Nyquist frequency, about twice the Nyquist in most cases.

Step 3:
Shear wave velocity modeling: The refraction microtremor method interactively forward-models the normal-mode dispersion data picked from the p-f images with a code adapted from Saito (1979, 1988) in 1992 by Yuehua Zeng. This code produces results identical to those of the forward-modeling codes used by Iwata et al. (1998), and by Xia et al. (1999) within their inversion procedure. The modeling iterates on phase velocity at each period (or frequency), reports when a solution has not been found within the iteration parameters, and can model velocity reversals with depth.

Summary

As per the contract dated September 3, 2005, we conducted a refraction microtremor (ReMi) survey at the subject site. The objective was to determine shear-wave velocity profile underneath the sites. In addition to the average 100 feet (30 meter) velocity, the method also determines the velocity of layers and depth to interfaces at the site. This can be great value to engineers in designing foundations of buildings and seismic site classification and modeling studies. Based on average velocity is within the range for the subject site classified **"Site Class C"** as presented in Table 1615.1.1 in the International Building Code (IBC).

References

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Saito, M., 1979, Computations of reflectivity and surface wave dispersion curves for layered media; I, Sound wave and SH wave: Butsuri-Tanko, v. 32, no. 5, p. 15-26.

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Xia, J., Miller, R. D., and Park, C. B., 1999, Estimation of near-surface shear-wave velocity by inversion of Rayleigh wave: Geophysics, v. 64, p. 691-700.

APPENDIX D

In-Situ Density Test Results

Phase 1 at Golden Valley Ranch - Kingman

Test Pit Number	Test Depth	Density	Moisture	Proctor	In-Situ Compaction	% shrinkage	Average Shrinkage (%)
TP-1	1	101.2	4.4	128.7 @ 6.5	79	12.6	8.4
	5	107.7	3.2	---	84	7.0	
	9	109.5	3.5	---	85	5.8	
TP-2	2	112.0	5.6	128.7@ 6.5	87	3.3	8.5
	6	96.5	6.1	---	75	16.6	
	10	109.5	6.9	---	85	5.5	
TP-3	2	108.5	4.7	134.5 @ 7.5	81	10.3	9.4
	5	114.3	5.1	---	85	5.6	
	9	106.1	5.6	---	79	12.3	
TP-4	1.5	106.4	4.4	134.5 @ 7.5	79	12.1	12.4
	5.5	106.5	6.9	---	79	12.1	
	10	105.3	6.4	---	78	13.0	
TP-5	3	109.1	5.6	134.5 @ 7.5	81	9.9	11.9
	7	105.4	5.0	---	78	12.9	
	10	105.2	6.1	---	78	12.9	
TP-6	4	110.5	5.5	133.0 @ 6.9	83	7.7	5.6
	7	114.4	5.1	---	86	7.7	
	10	118.0	4.2	---	89	1.4	
TP-7	2	109.7	4.9	133.0 @ 6.9	82	8.4	5.1
	6	113.3	6.3	---	85	5.3	
	9	117.7	3.9	---	88	1.6	
TP-8	1	100.0	4.0	133.0 @ 6.9	75	16.5	8.9
	5	108.5	6.8	---	82	9.4	
	9	118.9	7.0	---	89	0.7	
TP-9	2	103.8	4.8	134.5 @ 6.1	77	14.2	7.2
	6	112.0	3.9	---	83	7.5	
	10	122.7	3.8	---	91	00	
TP-10	2	100.7	4.1	125.4 @ 8.0	80	10.8	6.9
	5	104.4	6.1	---	83	7.5	
	10	110.0	5.7	---	88	2.5	

In-Situ Density Test Results

Phase 1 at Golden Valley Ranch - Kingman

TP-11	3	98.0	5.3	125.4 @ 8.0	78	13.2	7.3
	7	107.1	6.7	---	85	5.1	
	10	108.9	4.7	---	87	3.5	
TP-12	2	98.9	7.2	131.3 @ 7.3	75	16.3	8.5
	8	110.0	5.2	---	84	6.9	
	10	115.3	4.9	---	88	2.4	
TP-13	3	102.1	5.1	131.3 @ 7.3	78	13.6	8.9
	6	107.0	4.4	---	81	9.5	
	9	114.2	5.0	---	87	3.6	
TP-14	4	104.0	6.7	131.3 @ 7.3	79	12.0	10.5
	8	107.4	4.7	---	82	8.8	
	10	105.4	3.9	---	80	10.8	
TP-15	2	105.0	5.1	128.4 @ 6.9	82	9.1	6.7
	7	108.0	5.0	---	84	6.5	
	10	110.5	3.2	---	86	4.4	
TP-16	4	107.4	3.8	128.4 @ 6.9	84	7.1	6.9
	8	100.3	3.5	---	78	13.2	
	10	114.0	4.0	---	89	1.3	
TP-17	2	101.6	4.9	128.4 @ 6.9	79	12.1	9.0
	6	104.2	2.3	---	81	9.8	
	10	109.5	3.5	---	85	5.2	
TP-18	3	104.1	3.1	128.4 @ 6.9	81	9.8	7.2
	7	106.8	5.2	---	83	7.6	
	10	110.7	5.5	---	86	4.2	
TP-19	1	111.0	3.9	134.3 @ 5.3	83	8.2	8.0
	5	112.1	5.0	---	83	7.3	
	8	110.7	4.8	---	82	8.4	
TP-20	3	113.6	3.7	134.3 @ 5.3	85	6.0	7.2
	7	105.1	3.4	---	78	13.0	
	10	117.6	4.8	---	88	2.7	
TP-21	4	110.5	4.6	135.0 @ 5.8	82	9.1	7.0
	8	106.6	5.3	---	79	4.0	
	10	111.9	5.8	---	83	7.9	

In-Situ Density Test Results

Phase 1 at Golden Valley Ranch - Kingman

TP-22	5	111.4	4.4	135.0 @ 5.8	83	8.3	5.0
	8	115.1	5.1	---	85	5.3	
	10	119.9	3.0	---	89	1.3	
TP-23	2	108.4	5.5	135.0 @ 5.8	80	10.8	6.7
	5	113.9	4.8	---	84	6.3	
	9	118.0	4.5	---	87	2.9	
TP-24	3	98.0	6.8	126.9 @ 8.7	77	14.2	8.1
	6	105.8	5.3	---	83	7.4	
	9	111.1	4.3	---	88	2.7	
TP-25	2	100.3	4.5	126.9 @ 8.7	79	12.2	5.2
	5	113.5	4.1	---	89	0.5	
	10	110.9	3.8	---	87	2.9	
TP-26	2	99.2	5.8	126.9 @ 8.7	78	12.2	7.2
	7	104.7	4.7	---	83	8.3	
	10	112.8	4.7	---	89	1.2	
TP-27	3	103.9	4.1	131.7 @ 7.9	79	12.3	8.1
	6	106.5	2.1	---	81	10.1	
	10	116.1	3.3	---	88	2.0	
TP-28	1	99.0	4.2	131.3 @ 7.1	75	16.2	11.3
	5	106.0	4.4	---	81	10.3	
	10	109.5	3.0	---	83	7.3	
TP-29	3	98.3	5.5	127.7 @ 8.5	77	14.0	7.4
	6	108.5	4.8	---	85	5.6	
	10	112.0	4.8	---	88	2.5	
TP-30	2	100.8	4.7	127.7 @ 8.5	79	12.3	9.2
	6	102.3	3.2	---	80	11.0	
	10	110.0	3.5	---	86	4.3	
TP-31	3	99.0	5.7	127.7 @ 8.5	78	13.9	11.4
	7	103.7	4.5	---	81	9.8	
	10	103.0	3.8	---	81	10.4	
TP-32	4	101.4	6.5	127.7 @ 8.5	79	11.8	9.2
	8	105.9	3.1	---	83	7.9	
	10	103.5	3.2	---	81	7.9	

In-Situ Density Test Results

Phase 1 at Golden Valley Ranch - Kingman

TP-33	5	98.3	4.1	125.4 @ 8.0	78	12.9	11.0
	7	94.9	3.3	---	76	15.9	
	10	108.0	4.8	---	86	4.3	
TP-34	2	102.0	4.2	125.4 @ 8.0	81	9.6	9.0
	6	105.1	5.4	---	84	6.9	
	10	101.0	3.1	---	81	10.5	
TP-35	3	101.4	6.5	125.4 @ 8.0	81	10.1	9.5
	7	103.2	4.6	---	82	8.6	
	10	101.7	5.8	---	81	9.9	
TP-36	1	102.7	4.8	131.4 @ 7.1	78	13.2	12.2
	5	106.3	5.0	---	81	10.1	
	10	102.6	3.1	---	78	13.2	
TP-37	3	104.6	5.4	131.4 @ 7.1	80	11.6	10.7
	7	103.2	6.3	---	79	12.7	
	10	109.0	6.0	---	83	7.8	
TP-38	4	104.0	3.5	131.6 @ 8.4	79	11.7	10.5
	8	108.0	2.2	---	82	8.8	
	10	105.5	3.0	---	80	10.9	
TP-39	2	104.2	3.9	131.6 @ 8.4	79	12.0	7.4
	7	108.7	3.8	---	83	8.2	
	10	115.9	4.4	---	88	2.1	

The approximately shrinkage average 8.5%; could vary plus or minus 2%. It should be noted that the above factors are estimates only, final earthwork balance factors could vary.

Appendix B

Influent Lift Station Calculations

FLYGT

PERFORMANCE CURVE

PRODUCT	TYPE
NP3085.183	MT

DATE	PROJECT	CURVE NO	ISSUE
2005-09-14	GOLDEN VALLEY RANCH	63-462-00-5306	1

	1/1-LOAD	3/4-LOAD	1/2-LOAD
POWER FACTOR	0.80	0.74	0.62
EFFICIENCY	77.5 %	78.0 %	75.5 %
MOTOR DATA	---	---	---

RATED POWER	3	hp
STARTING CURRENT ...	24	A
RATED CURRENT ...	4.5	A
RATED SPEED	1710	rpm
TOT.MOM.OF INERTIA ...	0.018	kgm2
NO. OF BLADES	2	

IMPELLER DIAMETER: 151 mm

MOTOR #	STATOR	REV
15-10-4AL	38D	12

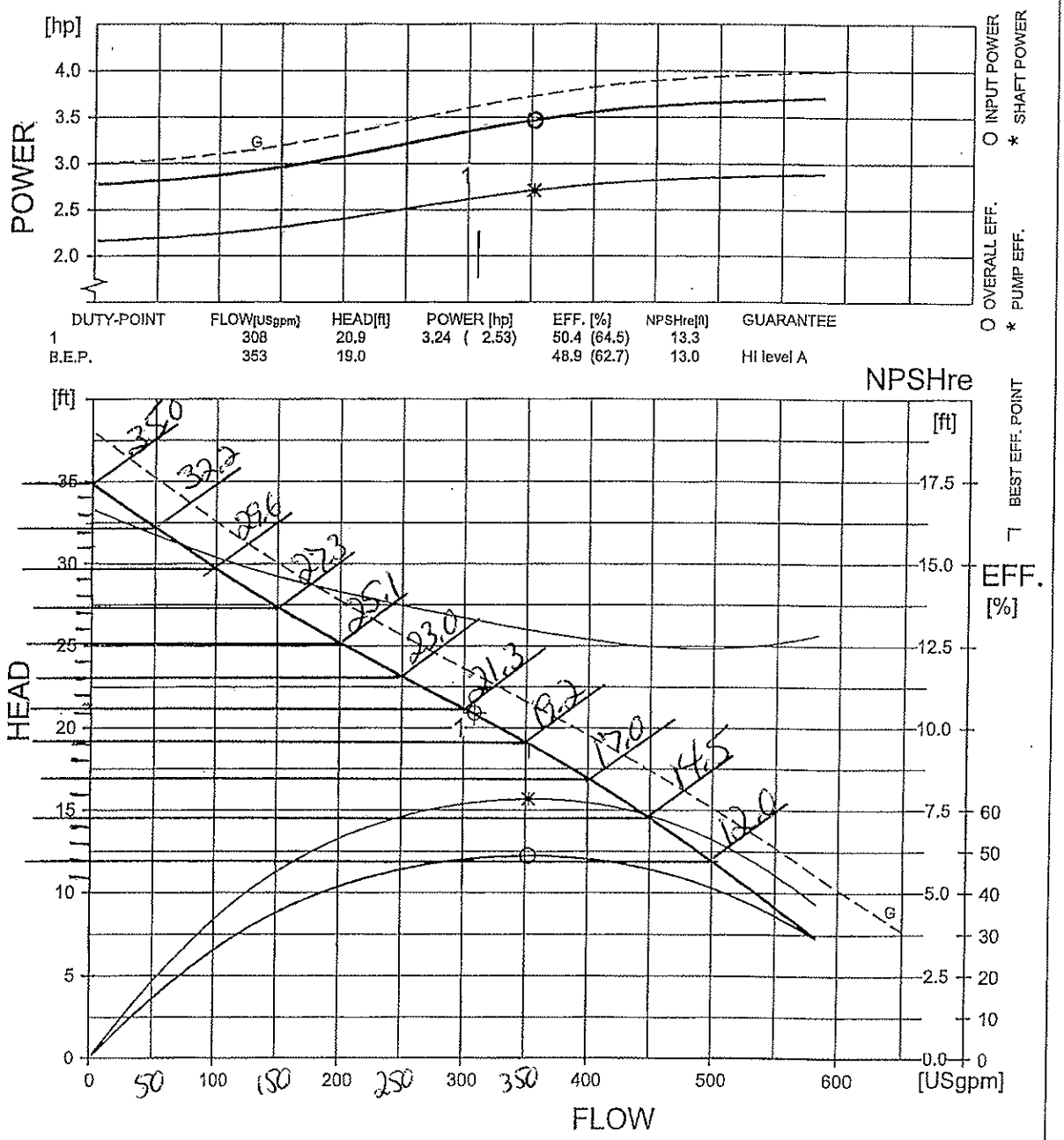
FREQ.	PHASES	VOLTAGE	POLES
60 Hz	3	460 V	4

GEARTYPE: --- RATIO: ---

COMMENTS

INLET/OUTLET: - / 3.0 inch

IMP. THROUGHLET: ---



DUTY-POINT	FLOW[USgpm]	HEAD[ft]	POWER [hp]	EFF. [%]	NPSHre[ft]	GUARANTEE
1	308	20.9	3.24 (2.53)	50.4 (64.5)	13.3	
B.E.P.	353	19.0		48.9 (62.7)	13.0	HI level A

FLYPS3.1.2.0 (20050224)

NPSHre = NPSH3% + min. operational margin

Performance with clear water and ambient temp 40 °C

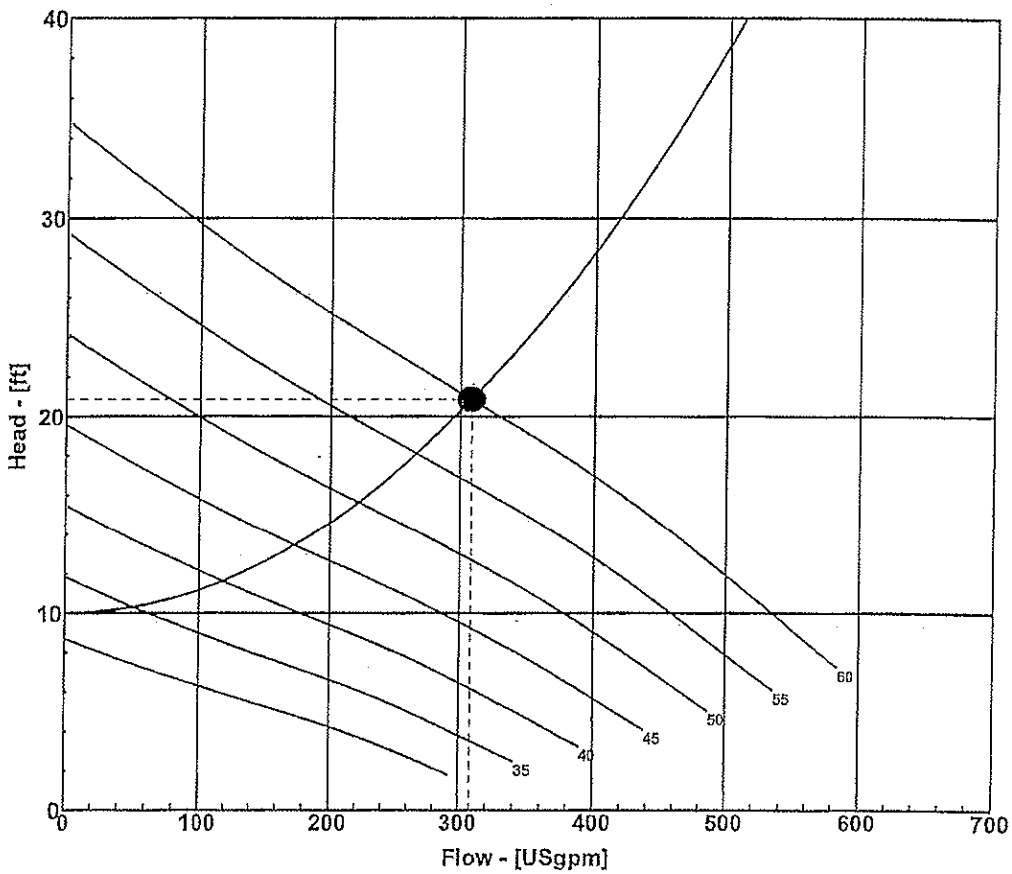
GUARANTEE BETWEEN LIMITS (G) ACC. TO

HI level A

VFD-Analysis - Performance

Project: GOLDEN VALLEY RANCH

Created by:: Ed Martin



Performance

Pump: N 3085 63-462-00-5306

PRODUCT DATA

Imp. diam.: 151 mm

Rtd. pwr.: 3 hp

Vanes: 2

Connection: Single

VFD connection: 1-VFD pump

No of pumps: 1

Frequency: 60 Hz

Flow: 308.1 USgpm

Head: 20.9 ft

Pwr cons.: 2.6 kW

Overall eff: 47.0 %

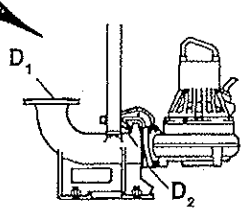
Spec. energy: 139.5 kWh/Mg

N-3085

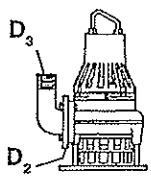
Section 3 | **Impeller/Motor/Nominal Sizes** | Issued: 6/02 | Supersedes:

PUMP MODEL	IMPELLER CODE	HP RATING				VAC	D1	D2	D3	D4
		NP	NS	NT	NZ					
N-3085 3Ø	462 MT	3.0	3.0	–	–	200 230/460 575	3, 4"	3"	3"	--
	463 MT	2.2, 3.0	2.2, 3.0	2.3	2.3		3, 4"	3"	3"	4"
N-3085 1Ø	463 MT	2.4	2.4	--	--	230	3"	3"	3"	--

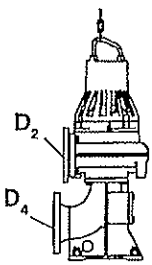
MT= Standard



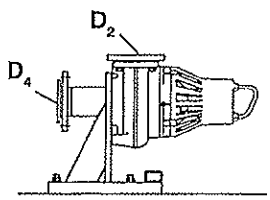
NP
(MT)



NS
(MT)



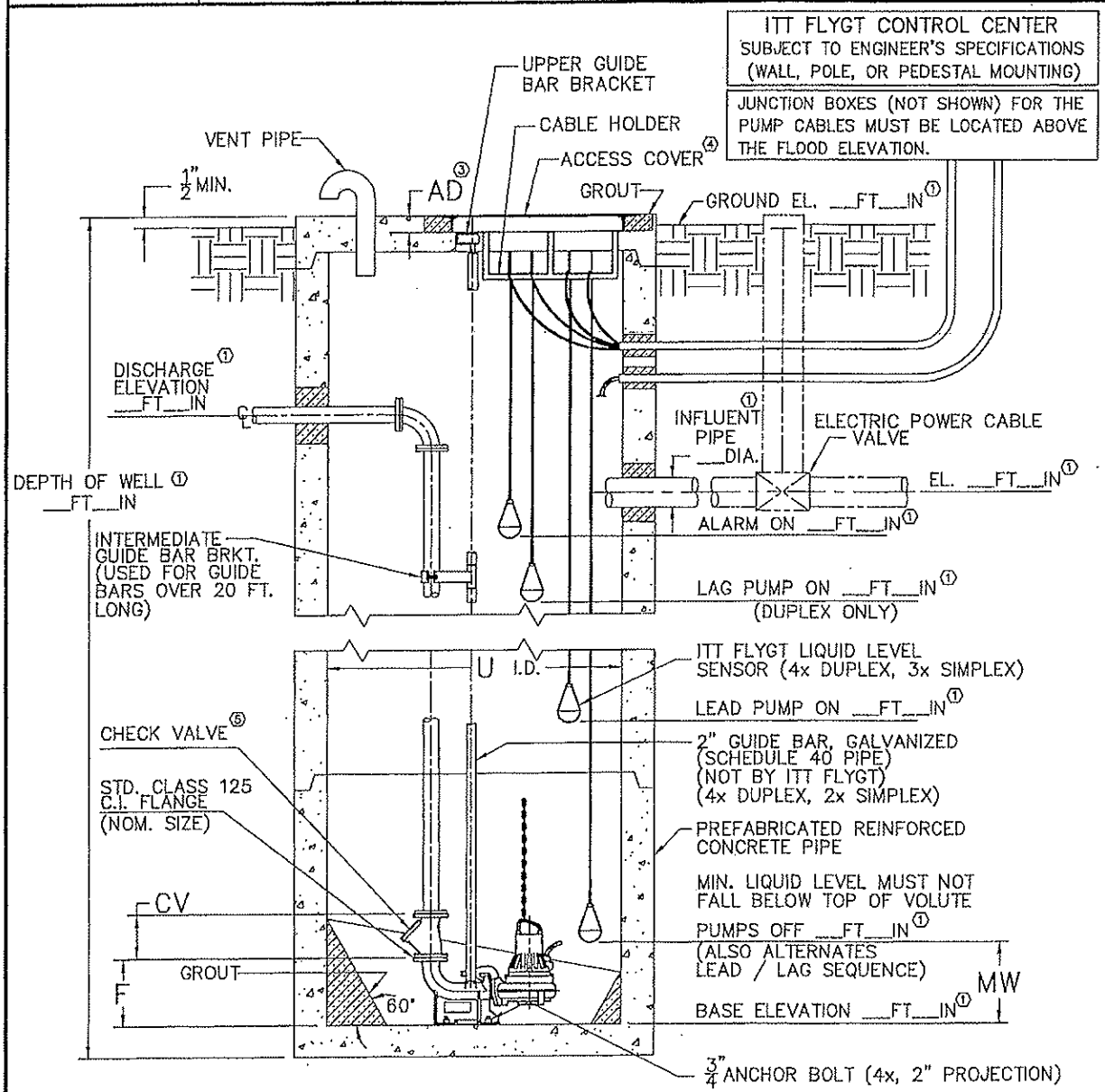
NT
(MT)



NZ
(MT)

CP/DP/NP-3085

e-Catalog	FLYGT	Lift Station Dimensions	Issued: 10/00	Supersedes: 04/96



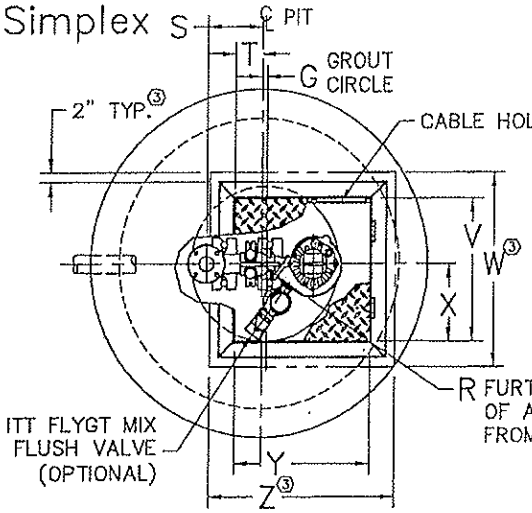
NOTES:

1. INDICATES INFORMATION TO BE DETERMINED BY OTHERS.
2. LOCATE ANCHOR BOLTS USING CLEAR INSIDE EDGE OF ACCESS FRAME AND CENTER LINE OF PUMP AS REF. POINT. BOLT LOCATIONS MUST BE HELD TO MAINTAIN EXACT POSITION OF PUMP RELATIVE TO ACCESS FRAME.
3. GROUT OPENING FOR ACCESS FRAME.
4. COVER SHOWN IS FOR STANDARD DUTY ANGLE FRAME. FOR ADDITIONAL DIMENSIONS ON STANDARD DUTY TROUGH FRAME, HEAVY DUTY ANGLE FRAME AND HEAVY DUTY TROUGH FRAME, CONSULT ITT FLYGT CORP. ENGINEERING DEPT.
5. CONFIGURATION AND DIMS. SHOWN ARE SUGGESTED REQUIREMENTS ONLY. ALL DETAILS, INCLUDING SIZING OF PIT, TYPE, LOCATION AND ARRANGEMENT OF VALVES AND PIPING, ETC. ARE TO BE SPECIFIED BY THE CONSULTING ENGINEER AND ARE SUBJECT TO HIS APPROVAL.
6. FOR PUMP DIMENSIONS REFER TO DIMENSIONAL DRAWING.

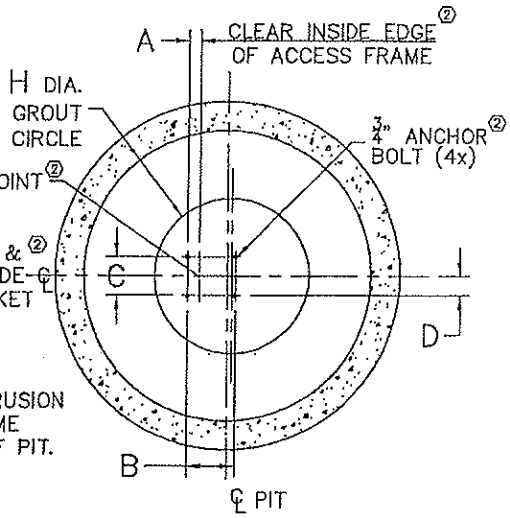
CP/DP/NP-3085

e-Catalog	FLYGT	Lift Station Dimensions	Issued: 10/00	Supersedes: 04/96

Simplex



TOP VIEW



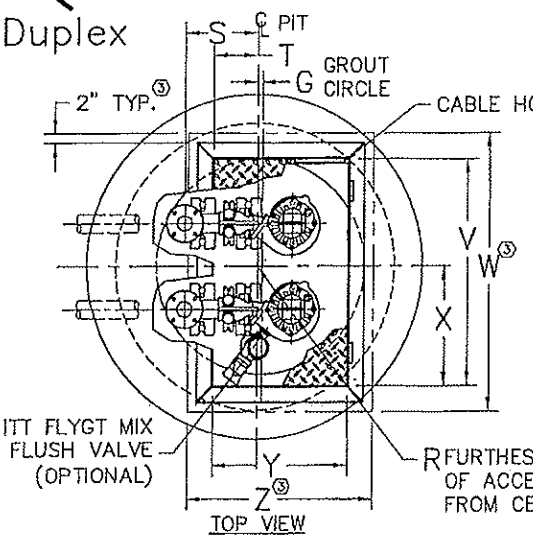
BASE SECTION

ALL DIMENSIONS ARE IN INCHES

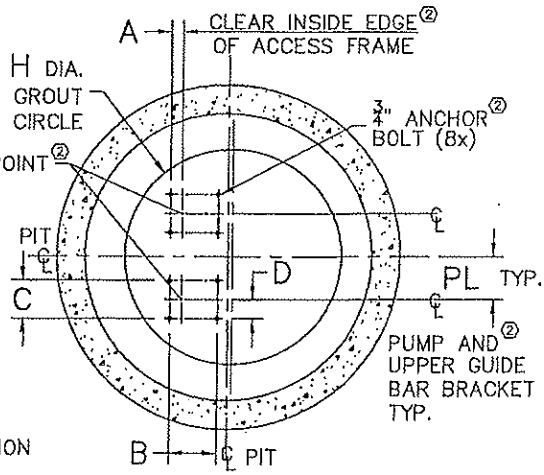
DIMENSIONAL CHART

MODEL	NOM. SIZE	VERSION	STATION A	B	C	D	F	G	H	R	S	T	U	CV	MW	COVER SIZE	V	W	X	Y	Z	AD
CP	3"	HT	2⅜	9⅞	8	4	15¾	1	32	32¼	11¾	5¼	60	9½	11	FLE-4 30 X 30	27½	41	14	27½	41	4
DP	3"	HT	2⅜	9⅞	8	4	15¾	1	34	32¼	11¾	5¼	60	9½	12	FLE-4 30 X 30	27½	41	14	27½	41	4
CP/DP/NP	3"	MT	2⅜	9⅞	8	4	15¾	1	32	33½	11¾	5¼	60	9½	12	FLE-4 30 X 30	27½	41	16	27½	41	4
CP/DP/NP	4"	MT	2¼	9⅞	8	4	15¾	1	32	33½	12½	6	60	11½	12	FLE-4 30 X 30	27½	41	16	27½	41	4

Duplex



TOP VIEW



BASE SECTION

ALL DIMENSIONS ARE IN INCHES

DIMENSIONAL CHART

MODEL	NOM. SIZE	VERSION	STATION A	B	C	D	F	G	H	R	S	T	U	CV	MW	PL	COVER SIZE	V	W	X	Y	Z	AD
CP	3"	HT	2⅜	9⅞	8	4	15¾	1	45	37	15½	9½	60	9½	11	8	FLE-6 30 X 48	45½	59	25	27½	41	4
DP	3"	HT	2⅜	9⅞	8	4	15¾	1	45	37	15½	9½	60	9½	12	8	FLE-6 30 X 48	45½	59	25	27½	41	4
CP/DP/NP	3"	MT	2⅜	9⅞	8	4	15¾	1	45	37	15½	9½	60	9½	12	9	FLE-6 30 X 48	45½	59	25	27½	41	4
CP/DP/NP	4"	MT	2¼	9⅞	8	4	15¾	1	45	37	16½	10	60	11½	12	9	FLE-6 30 X 48	45½	59	25	27½	41	4

C/D/N-3085

Section 6 | **Electrical Data** | Issued: 4/01 | Supersedes: 4/00

Motor Data

RATED OUTPUT POWER HP (kW)	Ø	VOLTS NOM.	FULL LOAD AMPS	LOCKED ROTOR AMPS	LOCKED ROTOR KVA	LOCKED ROTOR CODE LETTER KVA/HP	RATED INPUT POWER kW	POLES/RPM
1.6 (1.2)	1	230	7.1	23	5.3	B	1.6	4/1700
2.2 (1.6)	3	200 230 460 575	7.8 6.7 3.4 2.7	32 27 14 11	11.2	E	2.3	4/1685
2.4 (1.8)	1	230	10.0	46	10.6	D	2.3	4/1700
*2.9 (2.2)	1	230	12.0	47	11.0	C	2.8	2/3450
3.0 (2.2)	3	200 230 460 575	10.0 9.0 4.5 3.6	55 48 24 19	19.1	H	2.9	4/1700
*4.0 (3.0)	3	200 230 460 575	12.0 10.0 5.0 4.0	69 60 30 24	24.0	G	3.6	2/3430

PUMP MOTOR HP	EFFICIENCY			POWER FACTOR		
	100% LOAD	75% LOAD	50% LOAD	100% LOAD	75% LOAD	50% LOAD
1.6	75.0	76.6	74.1	0.98	0.99	0.97
2.2	72.5	74.5	73.5	0.85	0.79	0.69
2.4	80.0	81.7	79.0	0.98	0.99	0.97
*2.9	80.5	82.2	79.5	0.99	0.99	0.98
3.0	77.5	78.5	76.5	0.82	0.75	0.64
*4.0	81.5	82.5	81.5	0.92	0.89	0.83

Cable Data

HP	VOLTS	MAX. LENGTH FT.	CABLE SIZE/ NOMINAL DIA.	CONDUCTORS (IN ONE CABLE)	PART NUMBER
1.6	230	145	14/7 19.0mm (0.75")	(3) 14 AWG (PWR) (2) 14 AWG (CTRL) (1) 14 AWG (GND) (1) 14 AWG (GC)	94 21 02
2.2	200 230 460 575	160 210 835 1315			
2.4	230	105			
*2.9	230	90			
3.0	200 230 460 575	130 165 655 1025			
*4.0	200 230 460 575	105 135 530 825			

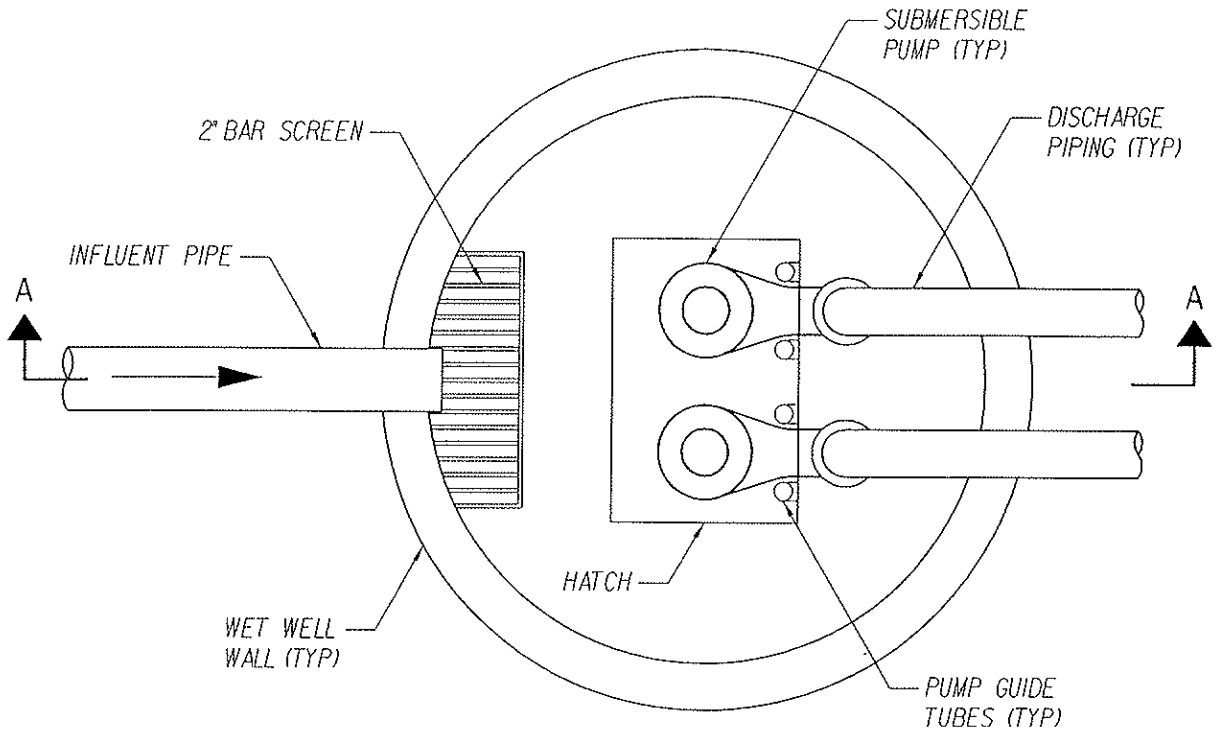
* For Vortex Impeller Pumps

Appendix C

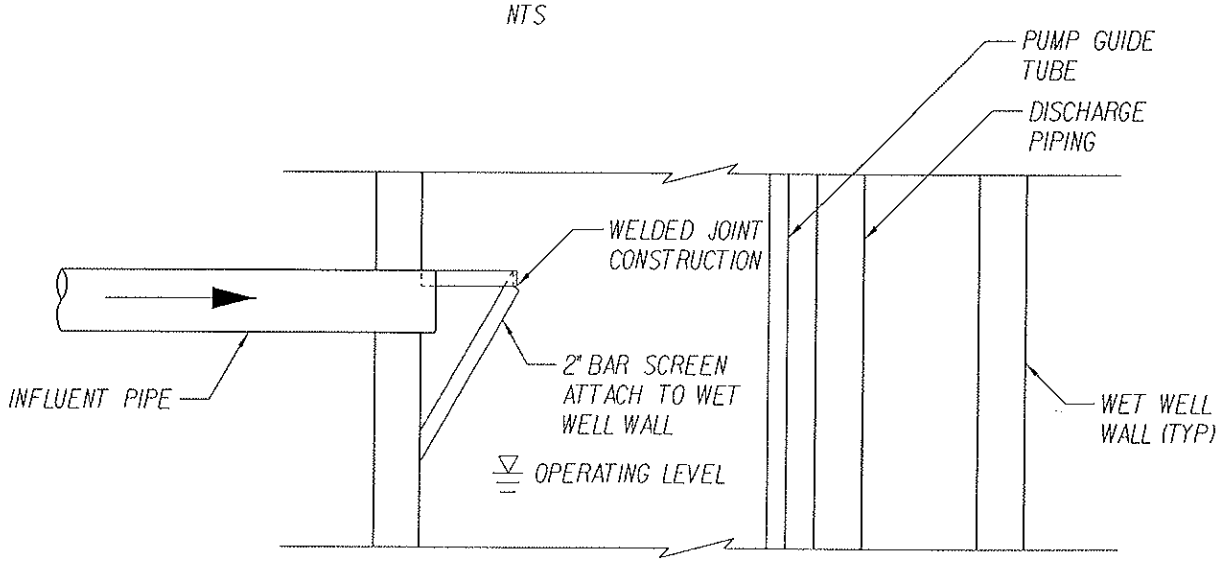
Estimated Costs

Appendix D

Equipment Cut Sheets



PLAN VIEW
NTS



SECTION A-A
NTS

REVISIONS	DWN	APVD	APVD	DATE

Stanley Consultants INC.

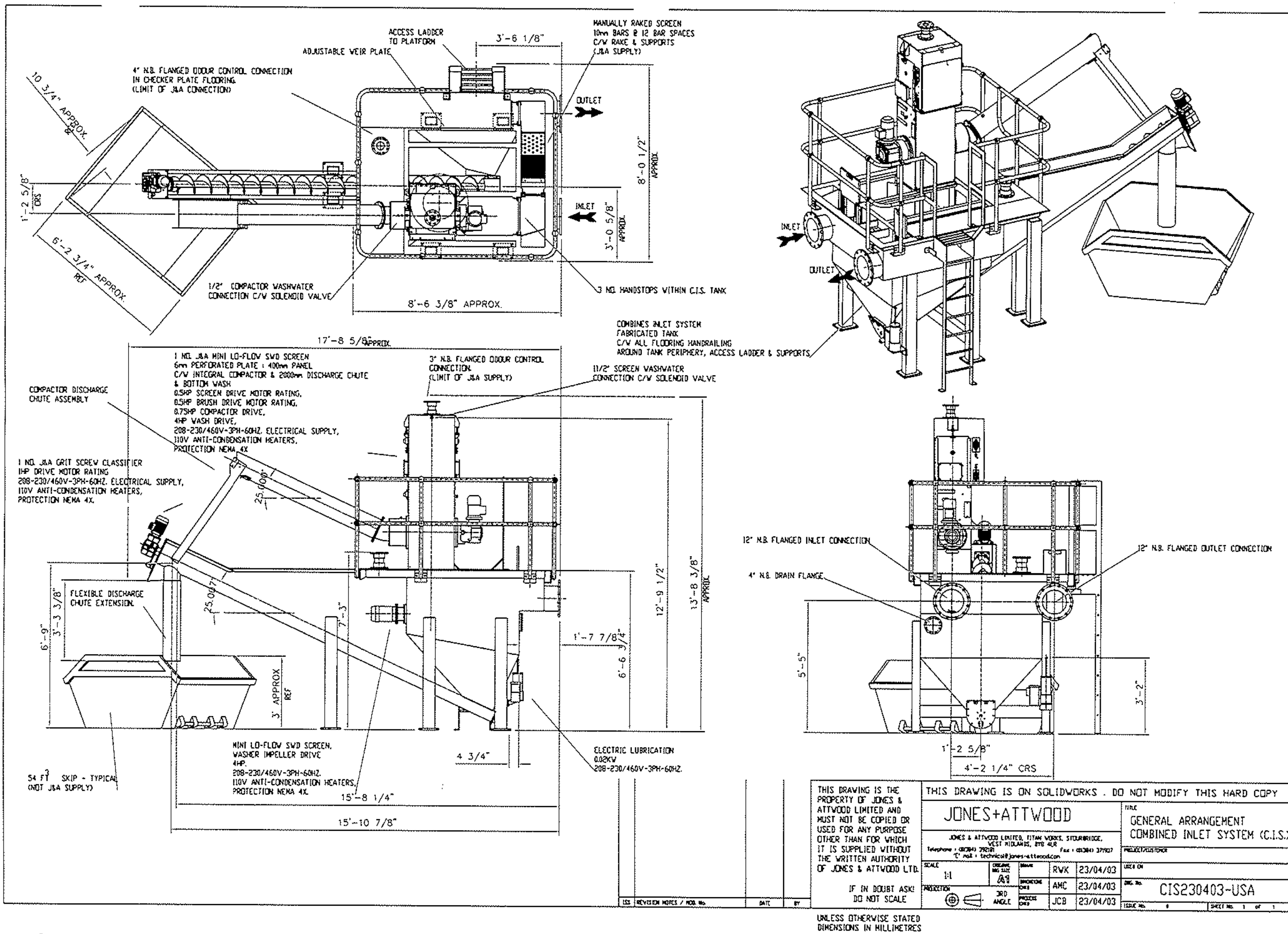
DESIGNED DKH
DRAWN DKH
CHECKED BED
APPROVED
APPROVED
DATE 9/15/2005

RHODES HOMES
GOLDEN VALLEY SOUTH
WATER RECLAMATION FACILITY
DESIGN REPORT

WET WELL
BAR SCREEN

SCALE NONE
NO. 18448.04.02
REV. 0

C:\Documents and Settings\6276\Desktop\wetwell bar screen.dgn
CADD AL-R4


ACCESS LADDER TO PLATFORM
ADJUSTABLE WEIR PLATE
3'-6 1/8"
MANUALLY RAKED SCREEN 10mm BARS @ 12 BAR SPACES C/W RAKE & SUPPORTS (J&A SUPPLY)
4" N.B. FLANGED ODOUR CONTROL CONNECTION IN CHECKER PLATE FLOORING (LIMIT OF J&A CONNECTION)
10 3/4" APPROX. REF
OUTLET
INLET
8'-0 1/2" APPROX
3'-0 5/8" APPROX.
1'-2 5/8" CRS
6'-2 3/4" APPROX. REF
1/2" COMPACTOR WASHWATER CONNECTION C/W SOLENOID VALVE
8'-6 3/8" APPROX.
3 NO. HANDSTOPS WITHIN C.I.S. TANK
COMBINES INLET SYSTEM FABRICATED TANK C/W ALL FLOORING HANDRAILING AROUND TANK PERIPHERY, ACCESS LADDER & SUPPORTS
17'-8 5/8" APPROX
1 NO. J&A MINI LO-FLOW SWD SCREEN 6mm PERFORATED PLATE : 400mm PANEL C/W INTEGRAL COMPACTOR & 2000mm DISCHARGE CHUTE & BOTTOM WASH 0.5HP SCREEN DRIVE MOTOR RATING, 0.5HP BRUSH DRIVE MOTOR RATING, 0.75HP COMPACTOR DRIVE, 4HP WASH DRIVE, 208-230/460V-3PH-60HZ. ELECTRICAL SUPPLY, 110V ANTI-CONDENSATION HEATERS, PROTECTION NEMA 4X
3" N.B. FLANGED ODOUR CONTROL CONNECTION (LIMIT OF J&A SUPPLY)
1 1/2" SCREEN WASHWATER CONNECTION C/W SOLENOID VALVE
COMPACTOR DISCHARGE CHUTE ASSEMBLY
1 NO. J&A GRIT SCREW CLASSIFIER 1HP DRIVE MOTOR RATING 208-230/460V-3PH-60HZ. ELECTRICAL SUPPLY, 110V ANTI-CONDENSATION HEATERS, PROTECTION NEMA 4X.
25.000°
25.00°
FLEXIBLE DISCHARGE CHUTE EXTENSION.
6'-9"
3'-3 3/8"
7'-3"
12'-9 1/2"
13'-8 3/8" APPROX
1'-7 7/8"
6'-6 3/4"
3' APPROX REF
54 FT³ SKIP - TYPICAL (NOT J&A SUPPLY)
MINI LO-FLOW SWD SCREEN, WASHER IMPELLER DRIVE 4HP. 208-230/460V-3PH-60HZ. 110V ANTI-CONDENSATION HEATERS, PROTECTION NEMA 4X.
4 3/4"
15'-8 1/4"
15'-10 7/8"
ELECTRIC LUBRICATION 0.02KW 208-230/460V-3PH-60HZ.
12" N.B. FLANGED INLET CONNECTION
4" N.B. DRAIN FLANGE
12" N.B. FLANGED OUTLET CONNECTION
5'-5"
3'-2"
1'-2 5/8"
4'-2 1/4" CRS
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JONES+ATTWOOD
JONES & ATTWOOD LIMITED, TITAN WORKS, STOURBRIDGE, WEST MIDLANDS, DY8 4LR
TITLE
GENERAL ARRANGEMENT COMBINED INLET SYSTEM (C.I.S.)
SCALE 1:1
A1
3RD ANGLE
RWK 23/04/03
AMC 23/04/03
JCB 23/04/03
CIS230403-USA
ISS. REVISION NOTES / MOD. No. DATE BY
UNLESS OTHERWISE STATED DIMENSIONS IN MILLIMETRES

Begay, Marcel

From: Phil Northrop [pnorthrop@goblesampson.com]
Sent: Thursday, January 05, 2006 3:04 PM
To: Begay, Marcel
Cc: DiFrancisco, Bruce
Subject: FW: Golden Valley, AZ B06-003


BPR .05Jan06.doc (183 KB)


GoldernleyB06-003.Spec.Dr


Brochure.pdf (1 M...

ACE Screener

Marcel/Bruce: Attached find the first of three options for headworks screening/screenings conditioning options. Brackett Green is offering their AceScreener system in a flanged end (in/out) tank for this application. It can easily handle the pumped flow of 320 GPM and provides a compact, easily moved, self contained system. The Excel file contains a sample specification.

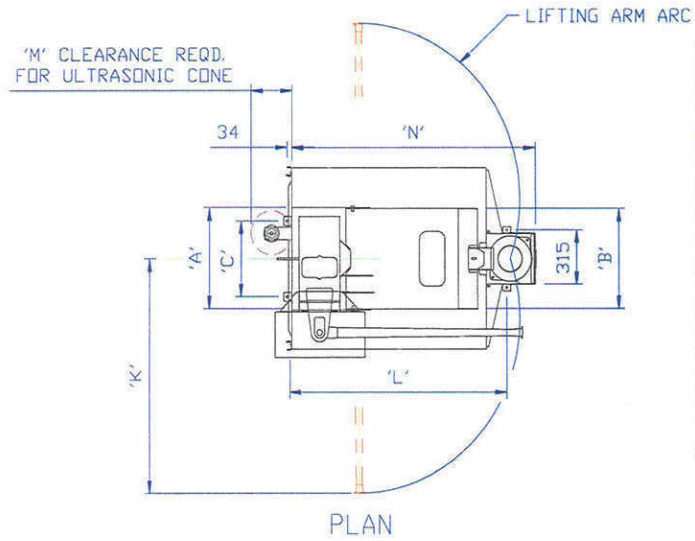
Phil Northrop

Goble Sampson Assoc. Inc.
2120 E. 6th Street, Ste. 12
Tempe, AZ 85281
Phone: 480-969-3667
FAX: 480-969-4096
pnorthrop@goblesampson.com
For a list of Water & Wastewater Products and Services offered by Goble Sampson Associates, please visit our website at www.goblesampson.com

-----Original Message-----
From: Impero James [mailto:James.Impero@glv.com]
Sent: Thursday, January 05, 2006 2:08 PM
To: Phil Northrop
Subject: Golden Valley, AZ B06-003

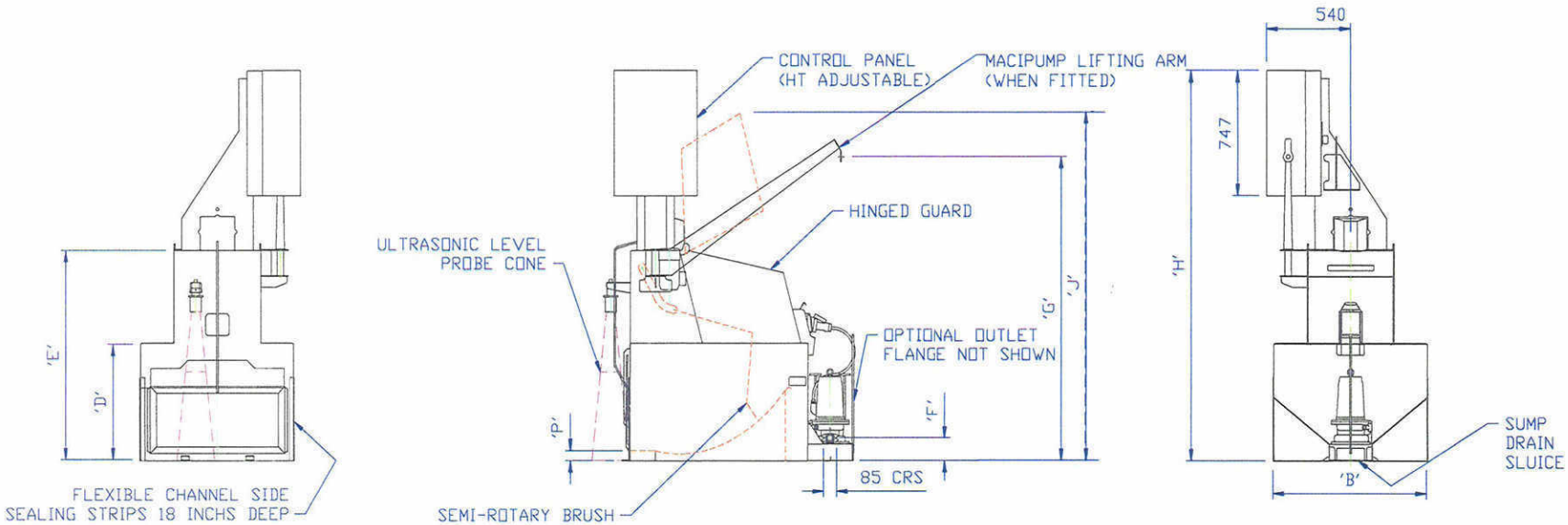
Phil,

For .533 MGD we sized the AceScreener, Model 740 2.0mm which has an integral screenings conditioning system identical to the MacerAcer (just smaller). The price for the total package with tank is less than $95,000. We have the AceScreener for these smaller applications.



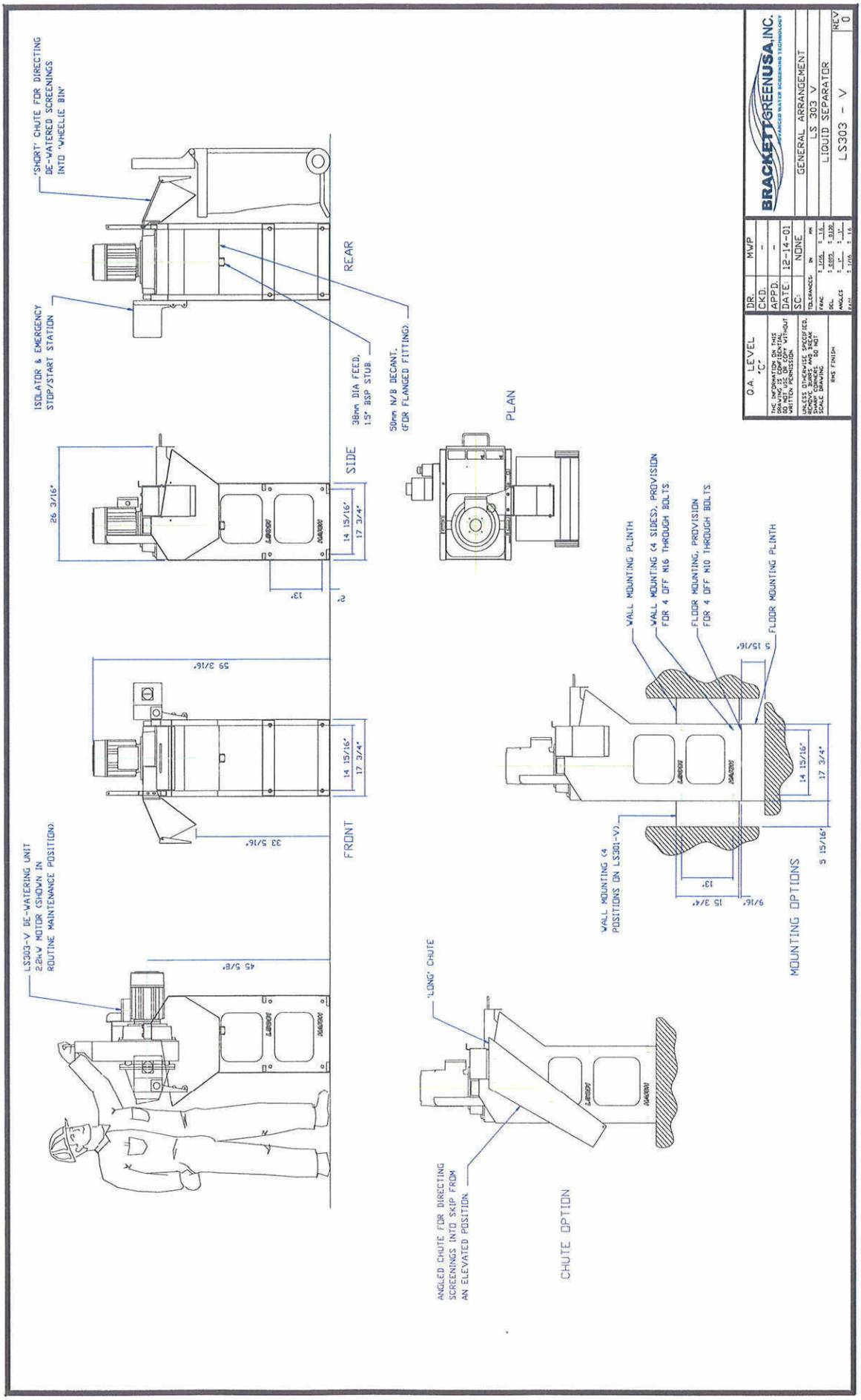
Flow Capacity (MGD)		0.228-0.684	0.342-0.912	0.342-1.14	0.342-1.35	0.570-1.71	0.798-2.28
ACE Model		490	590	740	591	741	991
Drawing Dimension	A	19 9/16	23 11/16	29 9/16	23 11/16	29 9/16	39 7/16
	B	19 5/16	23 3/16	29 3/16	23 3/16	29 3/16	38 15/16
	C	12 7/16	12 7/16	12 7/16	16 5/16	16 5/16	16 5/16
	D	20 13/16	20 13/16	20 13/16	27 9/16	27 9/16	27 9/16
	E	37 9/16	37 9/16	37 9/16	49 5/16	49 5/16	49 5/16
	F	4 15/16	4 15/16	4 15/16	5 5/16	5 5/16	5 5/16
	G	69 7/16	69 7/16	69 7/16	71 7/16	71 7/16	71 7/16
	H Min.	64 13/16	64 13/16	64 13/16	84 11/16	84 11/16	84 11/16
	H Max.	79 13/16	79 13/16	79 13/16	102 5/16	102 5/16	102 5/16
	J	63 7/16	63 7/16	63 7/16	83 9/16	83 9/16	83 9/16
	K	50 5/16	50 5/16	50 5/16	63 5/16	63 5/16	63 5/16
	L	40 13/16	40 13/16	40 13/16	51 7/16	51 7/16	51 7/16
	M	9 7/16	9 7/16	9 7/16	9 7/16	9 7/16	9 7/16
	N	46 3/16	46 3/16	46 3/16	56 13/16	56 13/16	56 13/16
	P	1 15/16	1 15/16	1 15/16	2 3/16	2 3/16	2 3/16

* The above capacities are based on an 6 mm. screen. For a 2 mm. screen reduce the capacity by 50 %.
** All dimension units are in inches.



BRACKETTGREENUSA,INC.
ADVANCED WATER SCREENING TECHNOLOGY

Site: Golden Valley
Client: Stanley Consultants
Model Recommended: Ace Screener Model 740 , 2 mm perforations


'SHORT' CHUTE FOR DIRECTING DE-WATERED SCREENINGS INTO 'WHEELIE BIN'
ISOLATOR & EMERGENCY STOP/START STATION
REAR
38mm DIA FEED, 1.5" BSP STUB.
50mm N/B DECANT, (FOR FLANGED FITTING).
SIDE
PLAN
26 3/16"
14 15/16"
17 3/4"
13"
59 3/16"
33 5/16"
FRONT
LS303-V DE-WATERING UNIT 2.2kW MOTOR (SHOWN IN ROUTINE MAINTENANCE POSITION).
45 5/8"
WALL MOUNTING PLINTH
WALL MOUNTING (4 SIDES), PROVISION FOR 4 OFF M16 THROUGH BOLTS
FLOOR MOUNTING, PROVISION FOR 4 OFF M10 THROUGH BOLTS
FLOOR MOUNTING PLINTH
5 15/16"
WALL MOUNTING (4 POSITIONS ON LS301-V).
15 3/4"
9/16"
MOUNTING OPTIONS
'LONG' CHUTE
ANGLED CHUTE FOR DIRECTING SCREENINGS INTO SKIP FROM AN ELEVATED POSITION
CHUTE OPTION
O.A. LEVEL 'C'
DR. MWP
CKD. -
APPD. -
DATE 12-14-01
SC: NONE
TOLERANCES: IN MM
FRAC ± 1/16 ± .13
DEC ± .020 ± .030
ANGLES ± 1° ± 1°
FINI ± 1/63 ± 1.6
RMS FINISH
THE INFORMATION ON THIS DRAWING IS CONFIDENTIAL AND MUST NOT BE COPIED WITHOUT WRITTEN PERMISSION
UNLESS OTHERWISE SPECIFIED, REMOVE BURRS AND BREAK SHARP EDGES. DO NOT SCALE DRAWING
BRACKETT GREENUSA INC.
ADVANCED WATER SCREENING TECHNOLOGY
GENERAL ARRANGEMENT
LS 303 V
LIQUID SEPARATOR
LS303 - V
REV 0

SECTION 11325

INTEGRATED-SCREENING, CONDITIONING, & DEWATERING EQUIPMENT

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings, General Provisions of Contract, and Specifications Sections apply to work of this section.

B. Requirements of the following sections apply:

1. Section 01300 – SUBMITTALS
2. Section 01400 – QUALITY CONTROL
3. Section 01600 – MATERIAL AND EQUIPMENT
4. Section 01780 – CLOSEOUT SUBMITTALS
5. Section 01750 – PLANT STARTUP AND INITIAL OPERATION
6. Section 05500 – METAL FABRICATIONS
7. Section 09900 – PAINTING
8. Section 15170 – MOTORS
9. Division 16 – ELECTRICAL

1.02 DESCRIPTION OF WORK

A. Under this section of the specifications, the Contractor shall furnish and install One (1) Screening, Solids Conditioning/Dewatering System, One (1) set of controls and associated accessories as described herein.

B. The above-described equipment shall be installed in the Golden Valley Membrane Water Reclamation Facility (MWRF), as shown on the drawings and described herein.

C. The system controls, and accessories shall be the product of a single manufacturer who shall have sole responsibility for providing an integrated system, which is complete and operable in all aspects.

D. Minimum maintenance to the equipment is a prime consideration. Therefore, design alternatives will not be allowed.

1.03 QUALITY ASSURANCE

A. The manufacturer will have been regularly engaged in the design and manufacture of the Screening, Solids Conditioning and Dewatering System as detailed herein for at least five (5) years.

1.04 SUBMITTALS

A. Submit shop drawings and technical information to demonstrate compliance with this specification in accordance with Section 01300. The information shall include the following:

1. Dimension and assembly drawings, including plan view and sections, piping, and electrical drawings.
2. Wiring diagrams for all control panels.
3. Materials of construction for all components.
Operation and Maintenance Manuals: Five (5) copies of the Operation and Maintenance (O&M) Manuals shall be submitted to the Owner's Representative prior to delivery of the equipment. The O&M Manuals shall include instruction of storage, installation, start-up and operation maintenance, together with a complete parts list and a recommended spare parts list. The O&M Manuals shall comply with Section 01730.

B. Warranty: The Contractor shall warrant that all equipment furnished by him shall be free from defects in the material and workmanship for a period of one (1) year from the date of acceptance. Warranties shall be in accordance with Section 01780.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Screening, Conditioning & Dewatering Equipment

1. Brackett Green USA Inc., ACE Screener™ Model 740

B. Control System

1. Brackett Green USA Inc.

2.02 Wastewater & Screenings Processing Equipment

A. General

The ACE Screener; an integrated Screen, Screening's Conditioning & Dewatering Equipment System consists of a screening unit and a liquid separating station. The screening unit shall be fitted within a concrete channel and will be capable of passing the Average Daily Weather Flow (DWF) and the Peak Hour Flow (PDF) as indicated in the tables below.

The screening unit will be generally constructed from a stainless steel fabrication forming a channel through which the raw sewage will flow. Screenings will be retained by a profiled, perforated screening plate with aperture size as indicated below, clamped into position. Screenings will be transferred to a hopper by a semi-rotating brush arm driven by motor & gearbox at 6 RPM. The brush arm will be spring loaded to ensure contact with the screen plate and will house replaceable brush cartridges. The brush arm will park (i.e. stop) out of the flow when not cycling. Access to the semi-rotating brush mechanism will be guarded by a hinged cover bolted into position.

The screen shall be designed to operate under all conditions indicated without any additional spray wash water.

The screening unit will include a macerator pump (i.e. Maci Pump) mounted on the screenings hopper and will consist of an open vane impeller coaxially mounted on a shaft with a cutting mechanism which compensates for wear. The cutting mechanism will comprise a headstock shearing against a fixed shear plate. Powered by an electric motor, the Maci pump will be capable of transporting conditioned screenings and organic material in solution/suspension up to 10 ft. / 3m. The electric motor will be IP67 or equivalent NEMA rated.

The liquid separating (i.e. Li Sep) station will be mounted at coping or ground/deck level, bolted to a plinth to enable a collection bin to be conveniently positioned. The separator station will consist of a fabricated stainless steel structure housing a LS303V liquid separator capable of separating the solid phase from the liquid phase at flows up to 48 GPM / 3 l/s, ensuring that organic matter passes through the separator with the liquid phase passing back to the main flow for treatment. The construction of the station will be such that the liquid separator will be "pivot mounted" to accommodate easy maintenance and inspection access.

The solid phase output from the liquid separator station will be "confetti like", relatively odor & fecal matter free, unrecognizable, and collected in a wheeled bin, supplied with a weather-proof cover. The final product will be suitable for direct disposal to land fill or incineration.

B. Description of Operation

The System will include a Series 200 Macerator pump with outlet and shear plate with 3/8" holes. Each Macerator will be capable of pumping diluted sewage at a rate of 48 GPM to coincide with the LiSep, which will operate intermittently, based on the flow level. The conditioning tank will be fabricated from stainless steel with mounting facilities for Macerator pump. The sheared screenings are sent to the LiSep fitted with a 2.0 Hp motor. The LiSep consists of a replaceable rotor with stainless steel blades rotating within, but not in contact with, a pair of conical screens. Conditioned screenings in suspension enter the lower end of the conical screen. The rotating blades force the liquid through the screen holes while the solids pass up the screens. A flipper is coaxially mounted on the rotating shaft, which ejects the de-watered screenings through the exit port.

The contractor / purchaser will supply ABS or PVC pipe work to connect the discharge from the Maci pump to the liquid separating station, and an additional line to provide a return to flow for the liquid phase (i.e. decant line) back to the channel.

The control will integrate the functions of the screening unit and the liquid separator under all operating conditions. A SIM card will be used to control all the operating functions. An ultrasonic level controller positioned above the inlet of the screening unit will provide flow depth inputs to achieve level control requirements. The control gear will consist of isolators, MCB and motor rated MCB's, start/stop/reset buttons, individual lights, hours run meter, ammeters, emergency stop, frostat, programmable relay with SIM card facility and a switch for hand/off/auto run. The control gear will be housed in an IP67 / NEMA 4X rated stainless steel enclosure mounted on the screening unit (or optionally on a specially designed stand, for floor mounting if necessary to be positioned separately from the screening unit).

The Macipump will be provided with two "T" bolts used for removal of the Macipump. The "T" bolts can be unscrewed at deck level and the optional lifting arm be can attached to the eye bolt on the pump for ease in removal of the pump. The "T" and eye bolts together with the lifting arm prevent the need to enter the channel for Macipump maintenance.

Optional Bypass screen

A second screen will be located in a bypass channel. This screen will be hand raked and will consist of 3mm wide x 25mm deep bars spaced at 11mm centers and supported in a rigid frame. The height of the screen will not exceed the height of the screening unit perforated screen plate. The screenings will be manually scraped into a removable collection box using a screen rake. Screenings collected on the bypass screen shall be deposited directly into the screenings conditioning hopper of the screening unit with no carry-over, such that these screenings can be processed as described above. The screen, frame, removable collection box shall be of stainless steel.

C. Items and Options Included

Site	Golden Valley
1. Equipment Model	740
2. Liquid Being Screened	Domestic Sewage
3. Deck Level / Elevation	2.0 Ft.
4. Maximum Water Level / Elevation	1.48 Ft.
5. Minimum Water Level / Elevation	0.25 Ft.
6. Channel Base Level / Elevation	0.00 Ft.
7. Channel Depth	2.00 Ft.
8. Channel Width	2.00 Ft.
9. Minimum Channel Width	2.46 Ft.
10. Maximum Immersion	0.98 Ft.

D. HYDRAULIC DATA

1. Maximum Screen Capacity	356.5 gpm
2. Peak Flow @ Site	370 gpm
3. Screening Plate Aperture (hole) Size	2 mm
4. Velocity through Screen @ PDF	0.55 ft/s
5. Head Loss through Clean Screen @PDF	Less than 1 in.
6. Head Loss through 50% blind screen @PDF	Less than 1 in.

7. Data (1 thru 5) based on maximum immersion and clean screen conditions

E. SCREEN DATA

1. Number of Screens	One (1)
2. Effective Screening Width	2.46 Ft.
3. Inlet / Front Opening Width	1.03 Ft.
4. Design Differential	0.33 Ft.
5. Overall Screen Height (top of control panel)	6.65 Ft.
6. Overall (in channel) Screen Width	2.46 Ft.
7. Overall Screen (in channel) Length	3.85 Ft.
8. Torque Limiter Type	Current Monitor Overload
9. Brush Motor Size	0.33 Hp / 0.25 kW
10. Maci Pump Motor Size	2.7 Hp / 2 Kw
11. LiSep Motor Size	2.0 Hp / 1.5 Kw
12. Motor Speed	1200 RPM
13. Motor Type	Squirrel Cage Induction
14. Motor Enclosure	XP
15. Motor Insulation	Class "F"
16. Motor Supply	460 V, 3 phase, 60 HZ
17. Motor Space Heater	No
18. Screen Nominal Surface Speed	6 RPM
19. Screening Unit Weight	462 lbs
20. Disintegrator Weight	99 lbs
21. Control Gear Weight	77 lbs
22. Combined Weight	638 lbs
23. Liquid Separator Weight	253 lbs

F. OPTIONS INCLUDED

1. Control Panel (mounted on screening unit)	Yes
2. Control Panel (mounted on remote stand)	No
3. Pre-fab inlet housing with bypass channel, hand-rake screen and 2 support beams	No
4. Hazardous area including XP motor, excluding controls (in non-hazardous area)	Yes
5. Adjustable Feet	No
6. Pre-fab channel with 2 support beams	No
7. Screening unit inlet isolation blade	No
8. Maci pump Lifting Arm	Yes

G. MATERIALS OF CONSTRUCTION

1. General Frame Construction	304 Stainless Steel
2. Screening Plate Construction	Profiled Perforated Plate
3. Screening Plate Clamps	304 Stainless Steel
4. Splashguard / Cover	304 Stainless Steel
5. Frame Fasteners	Stainless Steel, Gr. 18-8
6. Screening Plate Fasteners	Stainless Steel, Gr. 18-8
7. Mesh Support Fasteners	Stainless Steel, Gr. 18-8
8. General Fasteners	Stainless Steel, Gr. 18-8
9. Foundation Fasteners	Stainless Steel, Gr. 18-8
10. Wheely Bin	High Density Polyethylene

2.03 CONTROL PANELS

A. General

1. One (1) control panel with ultrasonic level control, shall be furnished for the system.

2. Control Panel shall be provided in enclosures and shall include all switches, relays, timers, level sensors and logic devices as required to automatically operate the screen as an integrated system according to the sequence of operations required by client.

3. All electrical controls shall comply with the requirements of Division 16.

2.04 PROCESS DESCRIPTION

Control Sequence

The Control of the System is achieved via the use of a Programmable Relay. The brush screen delay start timer and the Maci pump run timer are the only adjustable timers (range 0 to 60 seconds).

Normal Cycle

The Screening Unit is fitted with an Ultrasonic level sensor up stream of the unit. At a level (approximately 200mm above the channel invert), the Maci pump and Liquid Separator will start and run for a set period (adjustable) initially set at 30 seconds, then the Maci pump will stop and the Liquid Separator will continue to run for a further 10 seconds then stop. The Maci pump and Liquid Separator will repeat this operation after a delay of 3 minutes, providing that the level in the channel has not dropped to the stop level (approximately 180mm above the channel invert).

When the Maci pump and Liquid Separator start, there is a delay (adjustable) initially set at 45 seconds before the brush screen starts.

The Brush screen continues to operate in the forward mode until the level drops to the stop level. On reaching the stop level the brush screen will continue to operate in the forward mode for a 40 second period then stop and wait for 5 seconds, then start in the reverse mode for 30 seconds.

After the time has elapsed (30 seconds), the brush will stop for 5 seconds then operate in the forward mode for 30 seconds, then park, which is detected by a proximity switch fitted within the screen unit. This keeps the process of hair pinning to a minimum.

Continuous Run Cycle

If the upstream level remains above the stop level for 10 minutes, the brush screen stops for 5 seconds then reverses for 30 seconds then stops. It then continues to operate in the forward

mode until the stop level is reached and then the reversing cycle, as described in normal Cycle.

Storm Cycle

If the upstream level continues to rise to the next setting on the ultrasonic controller (Relay 2), the Maci pump and Liquid Separator starts and runs for 7 minutes, then the Maci pump stops and the Liquid Separator runs on for a further 10 Seconds then stops.

During the 7 minute run, if the level falls to below the off Level of Relay 2, then the Maci pump stops immediately and the Liquid Separator runs on for a further 10 Seconds

Frost Cycle

The Screening Unit is fitted with a frost stat set at 28.4 °F (-2 °C). When the ambient temperature is less than 28.4 °F (-2 °C), the Maci pump, Liquid Separator and Brush Screen start and run for 1 minute and then stop. This operation is repeated every 20 minutes providing that the temperature is still low.

When the temperature rises above 28.4 °F (-2 °C) then the Maci pump, Liquid Separator and Brush Screen stop and revert to normal operation.

If during the frost cycle the level in the channel rises to the start level, the unit operates as described in the normal cycle.

The Liquid Separator is fitted with a guard interlock switch to prevent the unit running when it is tilted open for maintenance.

When the Liquid Separator is in this position, the Maci pump and the Brush Screen will be inhibited from operating until the Liquid Separator is closed and reset pushbutton on the control panel is operated.

The screen guard is fitted with a guard interlock switch to prevent the unit running when lifted open for maintenance.

When the guard is raised, the Brush Screen, Maci pump and Liquid Separator will be inhibited from operating until the guard is closed and the reset pushbutton on the panel is operated.

Faults

If any of the following faults occur all motors will stop.

1) Brush Screen thermal overload tripped.
2) Maci pump thermal overload tripped.
3) Liquid Separator thermal overload tripped.
4) Brush Screen motor rated circuit breaker tripped
5) Maci pump Motor rated circuit breaker tripped.
6) Liquid Separator motor rated circuit breaker tripped.
7) Brush screen guard switch (Guard Open)
8) Liquid Separator guard switch (Guard Open)

Ultrasonic Level Controller Settings

Relay No. 1 Start and Stop Unit Normal Level.
Relay No. 2 Start and Stop Maci pump, Liquid Separator and Brush Screen. Storm Level.
Relay No. 3 Spare
Relay No. 4 High Level Alarm
Relay No. 5 Ultrasonic Controller Failed.

2.05 FACTORY ASSEMBLY, TESTING, AND INSPECTION

A. The equipment will be shipped partially assembled, for erection and installation by the Contractor. The Engineer and/or owner may, at their option and own expense, witness the factory test.

2.06 SPARE PARTS

A. The following spare parts are recommended for two (2) year operation. These spare parts are optional and will be added to an order upon request.

Description:	Qty.
1. Bristle Sub Assembly	One (1) Set
2. Compression Spring	One (1)
3. Head Stock	One (1)

PART 3 EXECUTION

3.01 INSTALLATION

A. The contractor shall install the equipment as indicated on the drawings and as specified herein.

B. The equipment shall be erected in accordance with the manufacturer's recommendations.

3.02 INITIAL LUBRICATION

A. All lubrication required for initial operation shall be furnished and applied in accordance with the manufacturer's recommendations, where applicable.

3.03 INSPECTION, STARTUP AND TESTING

A. The manufacturer of the equipment shall provide a representative to check the installation, make final adjustments, supervise the initial startup of each mechanism and prepare a written report thereof for the Owner.

B. The representative shall also instruct the Owner's personnel in the operation and maintenance of the equipment for a period of one (1) four (4) hour day.

C. The manufacturer's representative shall be available for a minimum of one (1) eight (8) hour day(s) to perform the above.

PART 4 PERFORMANCE

4.01 SPECIFICATION

A. The ACE Screener will remove wastewater solids/debris larger than 2 mm design aperture and reduction in volume (VRR) of wet solids entering the conditioning and dewatering unit by approximately 80%.

DiFrancisco, Bruce

From: Phil Northrop [pnorthrop@goblesampson.com]
Sent: Thursday, November 17, 2005 11:39 AM
To: DiFrancisco, Bruce
Subject: FW: Kingman, AZ

And here is the other answer you were looking for.

Phil Northrop

Goble Sampson Assoc. Inc.
2120 E. 6th Street, Ste. 12
Tempe, AZ 85281
Phone: 480-969-3667
FAX: 480-969-4096
pnorthrop@goblesampson.com
For a list of Water & Wastewater Products and Services offered by Goble Sampson Associates, please visit our website at www.goblesampson.com

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From: Sumit Kalra [mailto:Sumit.Kalra@Enviroquip.com]
Sent: Thursday, November 17, 2005 9:12 AM
To: pnorthrop@goblesampson.com
Cc: Dave Ritter
Subject: Kingman, AZ

Phil,

We have revised the Kingman, AZ WWTP per our conversation. The revised layout and scope of supply have been attached. Please note that we have re-designed our MBR system for 80,000 gpd average flow.

The revised preliminary budgetary pricing for the proposed scope of supply is as follows:

- $656,000/per 80,000 GPD plant

Please let us know if you have any questions or comments.

Thanks,

Sumit Kalra, MS, E.I.T.
Membrane Applications
Enviroquip, Inc.
512-834-6036 (direct)
512-507-2777 (cell)

Kingman, AZ

PRELIMINARY SCOPE OF SUPPLY -- 80,000 GPD

Anoxic Basin

Equipment	Manufacturer	Unit Capacity		Pwr. (HP)	Cntrl Mthd	Qty
Mixer	ABS	8,000	gal.	2.3	PLC	1
Recycle Pumps (1 duty, 1 standby)	Gorman-Rupp	225	gpm	5	PLC	2
Recycle Pump Check Valves	Asahi	N/A	N/A	N/A	N/A	2
Recycle Pump Isolation Valves	Asahi	N/A	N/A	N/A	N/A	4
Recycle / WAS Flowmeters	Endress & Hauser	N/A	N/A	N/A	PLC	1
Level Switch (AX)	Conery	N/A	N/A	N/A	PLC	4
Recycle / WAS Valve (3-Way, Actuated)	Asahi	N/A	N/A	N/A	PLC	1

Pre-Aeration Basin

Equipment	Manufacturer	Unit Capacity		Pwr. (HP)	Cntrl Mthd	Qty
DO/Temp Probe	Danfoss	N/A	N/A	N/A	PLC	1
Diffusers	EDI	45	SCFM	N/A	Manual	1

MBR Basins #1-2

Equipment	Manufacturer	Unit Capacity		Pwr. (HP)	Cntrl Mthd	Qty
Submerged Membrane Units	Kubota	10,000	GPD	N/A	N/A	8
Diffuser Air Inlet Isolation Valves	Asahi	N/A	N/A	N/A	N/A	8
Diffuser Air Outlet Spectacle Blinds	Jamison	N/A	N/A	N/A	N/A	8
Permeate Isolation Valves	Asahi	N/A	N/A	N/A	N/A	8
Air Scour Valve (Actuated)	Asahi	N/A	N/A	N/A	PLC	2
Level Switch	Conery	N/A	N/A	N/A	PLC	2
Structural	Enviroquip	N/A	N/A	N/A	N/A	8
Lot of in-basin piping	Enviroquip	N/A	N/A	N/A	N/A	1

Permeate Collection System

Equipment	Manufacturer	Unit Capacity		Pwr. (HP)	Cntrl Mthd	Qty
Permeate Pumps (1 duty, 1 standby)	Gorman-Rupp/AMT	125	GPM	5	PLC	2
Pump Isolation Valves	Asahi	N/A	N/A	N/A	N/A	4
Pump Check Valves	Asahi	N/A	N/A	N/A	N/A	2
Pump Inlet Pressure Gauge	McMaster	30	inHg	N/A	Manual	2
Pump Inlet Pressure Gauge Isolation Valve	Asahi	N/A	N/A	N/A	N/A	1
Pump Outlet Pressure Gauge	McMaster	30/15	inHg/psi	N/A	Manual	2
Pump Outlet Pressure Gauge Isolation Valve	Asahi	N/A	N/A	N/A	N/A	1
Flow Control Valve (Actuated)	Asahi	N/A	N/A	N/A	PLC	1
Pressure Transmitter (TMP)	Endress & Hauser	15	psi	N/A	PLC	1
Pressure Transmitter (TMP) Isolation Valve	Asahi	N/A	N/A	N/A	N/A	1
Flow Meter	George Fischer	N/A	N/A	N/A	PLC	1
Flow Meter Isolation Valve	Asahi	N/A	N/A	N/A	N/A	1
Turbidimeter	Hach	N/A	N/A	N/A	PLC	1
Turbidimeter Isolation Valve	Asahi	N/A	N/A	N/A	N/A	1

Air Supply System

Equipment	Manufacturer	Unit Capacity		Pwr. (HP)	Cntrl Mthd	Qty
MBR Blowers (1 duty, 1 standby)	Tuthill	420/5	SCFM/psi	20	PLC	2
Pre-Air Blowers (1 duty, 1 standby)	Reitschle Thomas	45 / 5	SCFM/psi	5	PLC	2
Temperature Gauges	McMaster	N/A	N/A	N/A	N/A	4
Pressure Gauges	McMaster	N/A	N/A	N/A	N/A	4
Pressure Gauge Isolation Valves	Asahi	N/A	N/A	N/A	N/A	4
Check Valves	Asahi	N/A	N/A	N/A	N/A	4
Temperature Switches	United Electric	N/A	N/A	N/A	N/A	4
Air Flowmeters	Sierra Instruments	N/A	N/A	N/A	PLC	2

Membrane Cleaning System

Equipment	Manufacturer	Unit Capacity		Pwr. (HP)	Cntrl Mthd	Qty
Chemical Cleaning Tank	Ryan Herco	320	Gallon	N/A	N/A	1
Chemical Dosing Pump	Pacer	32	GPM	N/A	N/A	1
Seal-Less Pump Tube	Pacer	N/A	N/A	N/A	N/A	1
Spill Pallet	Ryan Herco	N/A	N/A	N/A	N/A	1

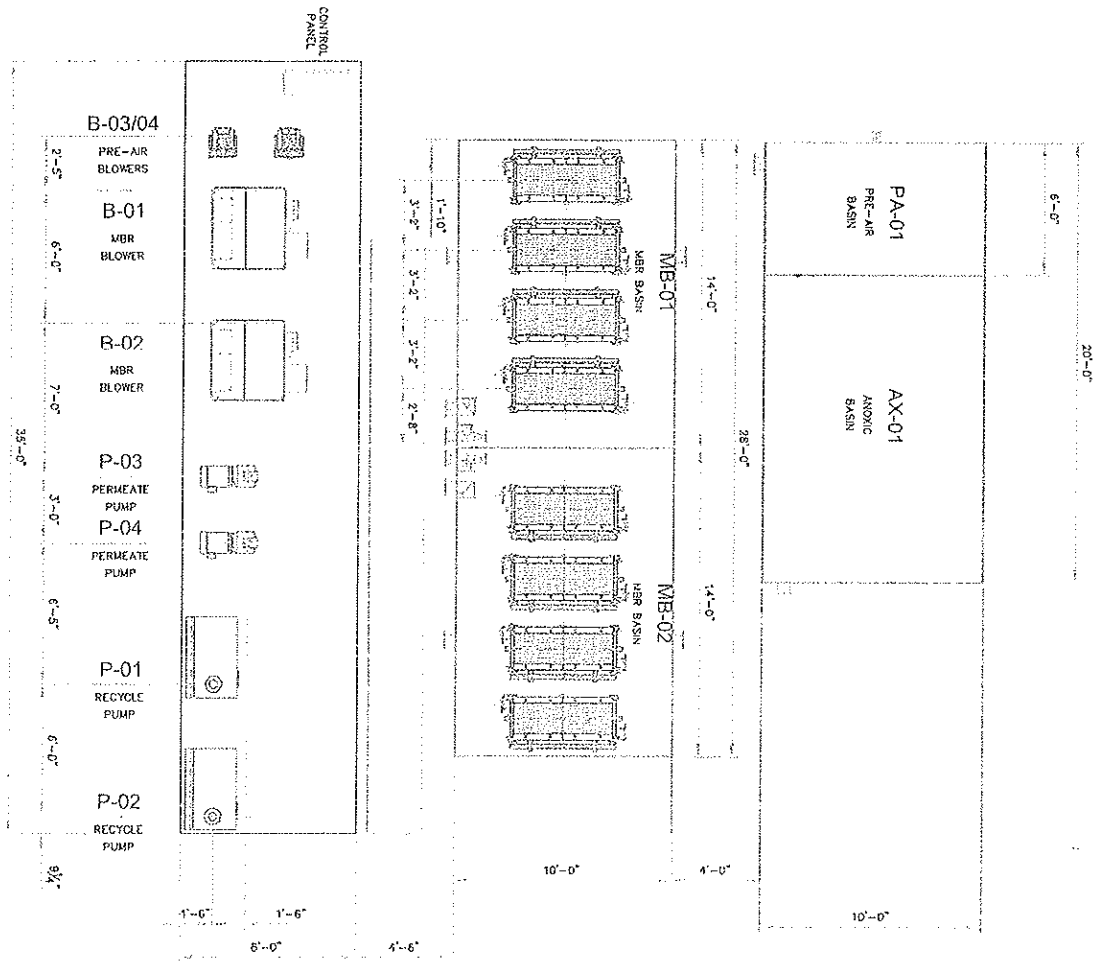
Plant Control System

Equipment	Manufacturer	Unit Capacity		Pwr. (HP)	Cntrl Mthd	Qty
SCADA	RSView32	N/A	N/A	N/A	N/A	1
PLC	Allen Bradley	N/A	N/A	N/A	N/A	1
Motor Control Panel w/ Motor Starters + VFDs	EOS	N/A	N/A	N/A	N/A	1

Miscellaneous						
Equipment	**Manufacturer**	**Unit Capacity**		**Pwr. (HP)**	**Cntrl Mthd**	**Qty**
MBR Tank	K&S Steel	N/A	N/A	N/A	N/A	1
Anoxic + Pre-Aeration Tank	K&S Steel	N/A	N/A	N/A	N/A	1
Covers	K&S Steel	N/A	N/A	N/A	N/A	2
Handrails	K&S Steel	N/A	N/A	N/A	N/A	2
Stairways	K&S Steel	N/A	N/A	N/A	N/A	2
Assembly	Enviroquip	N/A	N/A	N/A	N/A	1
Equipment Skid & Manifold Piping	Enviroquip	N/A	N/A	N/A	N/A	1

Contract Execution						
Start-up and Operator Training	Enviroquip	N/A	N/A	N/A	N/A	10
Operation & Maintenance Manuals	Enviroquip	N/A	N/A	N/A	N/A	5

PLOT DATE: --
PLOT SCALE: 1:1



NOT FOR CONSTRUCTION

SHEET OF XX |	Enviroquip, Inc. 2404 Rutland Drive, Suite 200 Austin, Texas 78758 phone: (512) 834-6000 • fax: (512) 834-6039	0.08 MGD MBR WWTP KINGMAN, AZ. MBR PLANT LAYOUT EQUIPMENT PLAN	SCALE: 3/16"=1'-0" DRAWN: TELFER CHECKED: -- DATE: 09-20-05
TITLE NAME: MKMAZEPOT JOB NO. -			THIS DATA IS PROVIDED ON A RESTRICTED BASIS AND IS NOT TO BE USED IN ANY WAY DETRIMENTAL TO THE INTEREST OF ENVIROQUIP, INC.

OZONIA

Medium Pressure UV Systems

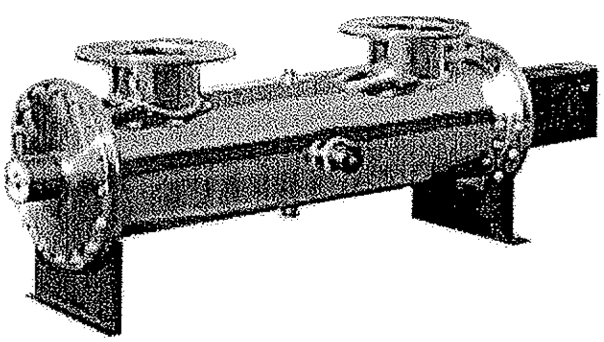
Waste Water Disinfection

Description

Disinfection of wastewater using a broad-spectrum medium pressure UV lamp with a high purity quartz sleeve.

Client benefits

- Inactivates biological contaminants commonly found in wastewater treatment that can prove hazardous to health.
- More cost effective than low pressure systems.
- Chemical-free disinfection minimizes effects on other waste treatment processes..



Product Features

- Medium pressure lamps provide broad spectrum UV energy that inactivates bacteria, cysts and spores.
- Magnetic ballast with optional step down function maximizes energy efficiency
- Flow-paced control with the step down option ensures optimum UV dose under varying conditions
- Fewer lamps reduces maintenance costs
- Automatic wiper system maintains optimum performance in a fouling environment
- UV intensity monitor displays condition of system

Secondary and tertiary effluent from water treatment plants, although relatively low in BOD and suspended solids in efficiently operated installations, contains a number of pathogenic micro-organisms that can cause serious diseases in people and animals. Disease can be transmitted orally by ingestion of infected water or by consumption of contaminated shellfish, or merely as a result of contact with the skin during swimming in contaminated water. The risk of disease is created by the discharge of infected water close to swimming areas, drinking water intakes and shellfish-farming locations or when used for agricultural purposes in the interests of water conservation.

The incorporation of a medium pressure broad spectrum germicidal irradiation system after final filtration of treated waste water economically provides the disinfection to meet the microbial standards required for safe discharge or re-use without the use of additional chemicals, which in themselves could add to the contamination load. Design of the UV system must relate to the minimum UV transmission value of the effluent and also to the peak flow. Industrial wastewater treatment plants may incorporate a medium pressure UV system in conjunction with ozone. This advanced oxidation process offers a powerful water treatment combination for reduction of difficult organic compounds.

- Compared with conventional low pressure mercury lamp systems the use of high intensity medium pressure models results in a dramatic reduction of numbers of lamps, space requirement and installation and lamp replacement costs.
- UV radiation of broad germicidal action applied at the correct dose rate destroys the ability of pathogens to metabolize and reproduce and is successful against viruses and bacteria.
- Ozonia medium pressure UV systems with high energy output per unit size are particularly applicable in this respect being specifically designed for the purpose and incorporating an automatic wiper with interval control to suit effluent quality.
- UV irradiation treatment eliminates the need for chemical handling and storage on site, or systems for dosing chemicals into the treatment stream.
- Cost savings for smaller waste water treatment installations when compared with open channel technology.

OZONIA NORTH AMERICA 201-794-3100 491 EDWARD H. ROSS DRIVE • ELMWOOD PARK, NJ 07407

OZONIA

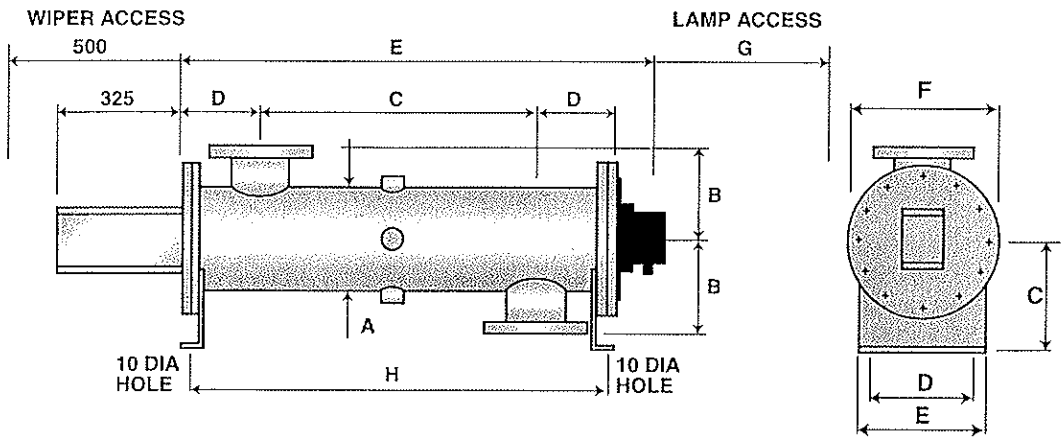
Specifications

SITE CONDITIONS:
Temperature: . . . . 5°C to 45°C
Humidity: . . . . . Up to 100%
MATERIALS:
Reactor: . . . . . 316 SS
Lamp: . . . . . High purity quartz
Sleeve: . . . . High purity quartz
Control Panel: . . . . . Mild steel
Protection Class: IP54
Standards: . . . EN / IEC / ISO
Conformity: . . . . . CE

CONNECTIONS:
Mains voltage: . . . . 3 phase - 480V
Frequency: . . . . . 50 Hz to 60 Hz
Flanges: . . . . . ANSI 150 RF

CONTROLS / SIGNALS:
On/Off: . . . . . Local / remote
Alarm: . . . . . Local / remote
UV Monitor: . . . . . Local / remote
Auto Wiper: . . . . . Local

SPARES AND OPTIONS:
- VELL017 – 3.0 kW Quartz UV Lamp Assembly
- VANC002 – Quartz Sleeve
- VVOR708 – Quartz Tube 'O' Ring Seal



MODEL REF.	FLOWRATE (GPM)	FLOWRATE (LPS)
SMP150-75-1/2WW	110	0.158
SMP150-75-1WW	220	0.317
SMP200-100-2WW	396	0.570
SMP250-150-3WW	660	0.950
SMP250-150-4WW	880	1.267

MODEL REF.	DIMENSIONS (inches)											IN / OUT (inches)
	A	B	C	D	E	F	G	H	I	K	L	
SMP150-75-1/2WW	6	6	27.5	5.75	42	8.75	35.5	37.5	6	7.5	7	3
SMP150-75-1WW												
SMP200-100-2WW	8	7	25.5	6.75		10.75			8.75	10.25	8.25	4
SMP250-150-3WW	10	8	23.5	7.75		12.75			10.25	11.75	10	6
SMP250-150-4WW												

FLOWRATES ARE BASED ON A UV DOSE OF 30 mJ/cm² AT END OF LAMP LIFE & 65% UV TRANSMISSION AT 254NM IN A 1CM CELL. HIGHER FLOWRATES ARE AVAILABLE ON REQUEST. DEVELOPMENT IS CONTINUOUS AND SPECIFICATIONS ARE SUBJECT TO ALTERATION AT ANY TIME WITHOUT NOTIFICATION.

Ozonia North America
www.ozonia.com
For details, specifications and pricing, call 201-794-3100
491 Edward H. Ross Drive • Elmwood Park, NJ 07407
Switzerland, Phone +41 (1) 801 85 11 • Scotland, Phone +44 (141) 810 48 61 • Russia, Phone +7 (8312) 33 44 84 • South Korea, Phone +82 (2) 631 03 30

AQUIONICS
World Leader
in Ultraviolet Technology

Quote No: 05-11-PB52
Date: November 30, 2005

Company: Western Environmental Equipment Co.

Attention: Dennis Gamache

From: Bree Grady, Sales Engineer

Project: Golden Valley Ranch Development, AZ

Parameters:

Water Evaluation:	70 % transmission in a 1cm light path at 253.7nm
Flowrate:	167 gpm peak; 140 gpm ADF
TSS:	<5 mg/L
Disinfection:	2.5- log reduction

Equipment Selection & Design:

Unit: InLine 250+
Quantity: 1
Each Unit/Train Treats: 167 gpm

Lamp Type: B2020 Medium Pressure
No. Lamps per Unit: 2
Lamp Configuration: Horizontal and perpendicular to flow

Included Features:
- Each unit comes complete with an automatic quartz cleaning system, UV monitor, temperature sensor, access hatch and manual lamp power level control.

Power & Controls:
- Standard power and controls are housed in one wall mounted epoxy coated steel cabinet per chamber. Cabinets are NEMA 12 rated, suitable for indoor installation.

Electrical Data:
480 V
3- phase
60 Hz

Connections: 5 " ANSI flanges

Budget Price: $26,400.00 (includes freight to site).

Terms:
-Quote valid for 60 days.
-Aquionics standard terms and conditions apply (available upon request).
-Delivery approx. 16-18 weeks.

AQUIONICS
World Leader
in Ultraviolet Technology

SPECS

TREATMENT CHAMBER

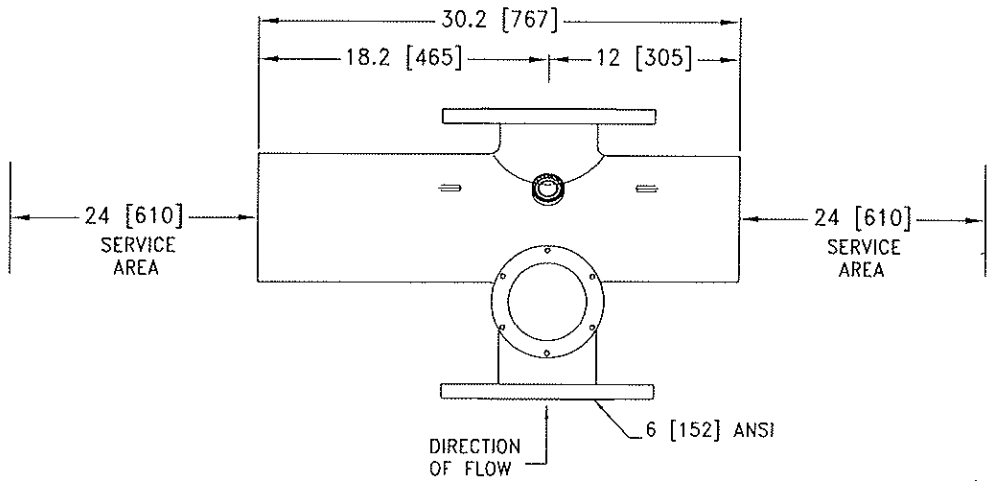
Model	: Inline 250+
Drawing	: INLN+06HA
Number per system	: 1
Material	: 316L stainless steel
Dimensions	
- length	: 18.3 in (465 mm)
- width	: 30.2 in (768 mm)
Weight	
- dry	: 115 lbs (52 kg)
- wet	: 143 lbs (65 kg)
Degree of protection	: NEMA12 (IP54)
Pressure rating	
- test	: 225 psi (15 bar)
- operational	: 150 psi (10 bar)
Operational water temperature	: 32–113 °F (0–45 °C)
Storage temperature	: 32–158 °F (0–70 °C)
UV lamp type	: B2020
Lamp life	: 8000 hrs
Number lamps per chamber	: 2
Inlet/Outlet connections	: 6 in ANSI
Features included	
- Access hatch	- UV sensor
- Temperature detector	- Cleaning mechanism (automatic)
- Manual air release valve	- Drain port
Options available	
- Cleaning mechanism (manual or chemical assisted)	
- Skid mounting	
- Drain valve	

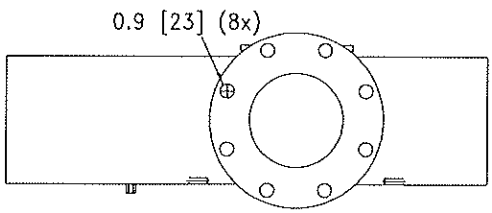
POWER/CONTROL MODULE

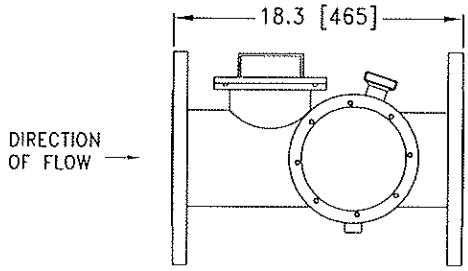
Model	: 2020HSC2
Drawing	: CLIN250+
Number per system	: 1
Material	: Wall mounted epoxy coated steel
Dimensions	
- height	: 47.2 in (1200 mm)
- width	: 31.5 in (800 mm)
- depth	: 15.7 in (400 mm)
Weight	: 385 lbs (175 kg)

Degree of protection	: NEMA12 (IP54)
Operational temperature	: 32–113 °F (0–45 °C)
Storage temperature	: 32–158 °F (0–70 °C)
Lamp power	
- level 1	: 1500 W
- level 2	: 1880 W
- level 3	: 2240 W
Power level control	: Manual
Controls	: ECtronic
Displays	
- UV% output	- Power ON
- Lamp ON	- UV alarm
- Water temp alarm	- Cabinet temp warning
- Cabinet temp alarm	- Hours run counter
- Wiper cycles counter	
Inputs	
- Remote ON/OFF	- Lamp power level
Outputs	
- Overtemperature alarm	- Low UV warning
- Ground fault	- Wiper failure
- UV intensity (mA)	
Electrical supply	
- voltage	: 480 V
- phase	: 3
- frequency	: 60 Hz
Power consumption (max.)	: 5 kW
Options available	
- Stainless steel cabinet	
- UVtronic control system (microprocessor based)	

21 KENTON LANDS ROAD ♦ ERLANGER, KY 41018 ♦ P: 859.341.0710 ♦ T: 800.925.0440 ♦ F: 859.341.0350 ♦ WWW.AQUIONICS.COM



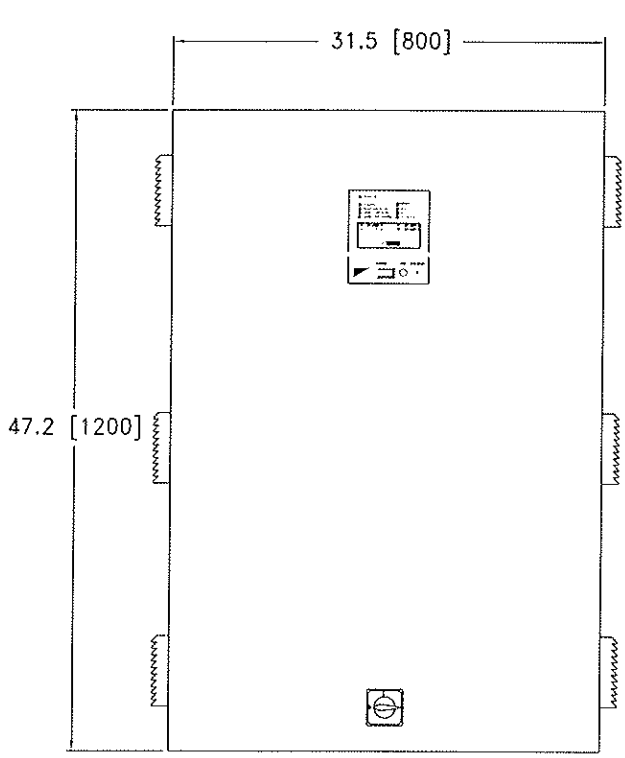


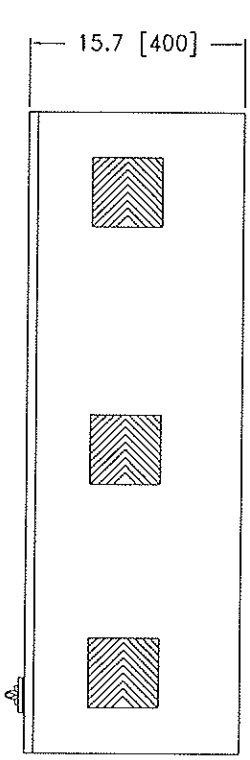


NOTES:
1. DIMENSIONS IN INCHES [MILLIMETERS].
2. DO NOT SCALE DRAWING.
3. CLEARANCE REQUIRED FOR SERVICE AND MAINTENANCE OF SYSTEM.
4. DIMENSIONS SUBJECT TO CHANGE.
5. ACCESS HATCH SHOULD BE PLACED UPSTREAM.

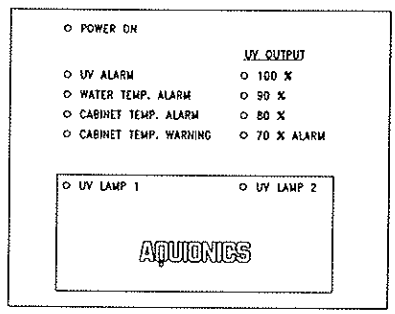
Title: INLINE 250+		Scale: NTS
WITH HATCH & AUTOMATIC WIPER		Page 1 of 1
6" ANSI FLANGES	Drawn: GCK	Date: 3/11/04
AQUIONICS A HALMA GROUP COMPANY	Appd: MJG	Date: 8/03/04
	Mat. 316L SS	Rev. B
	Part No.: INLN+06HA	

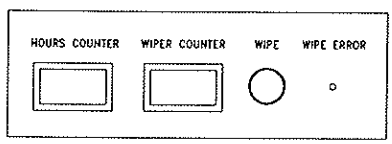
Aquionics Company Confidential





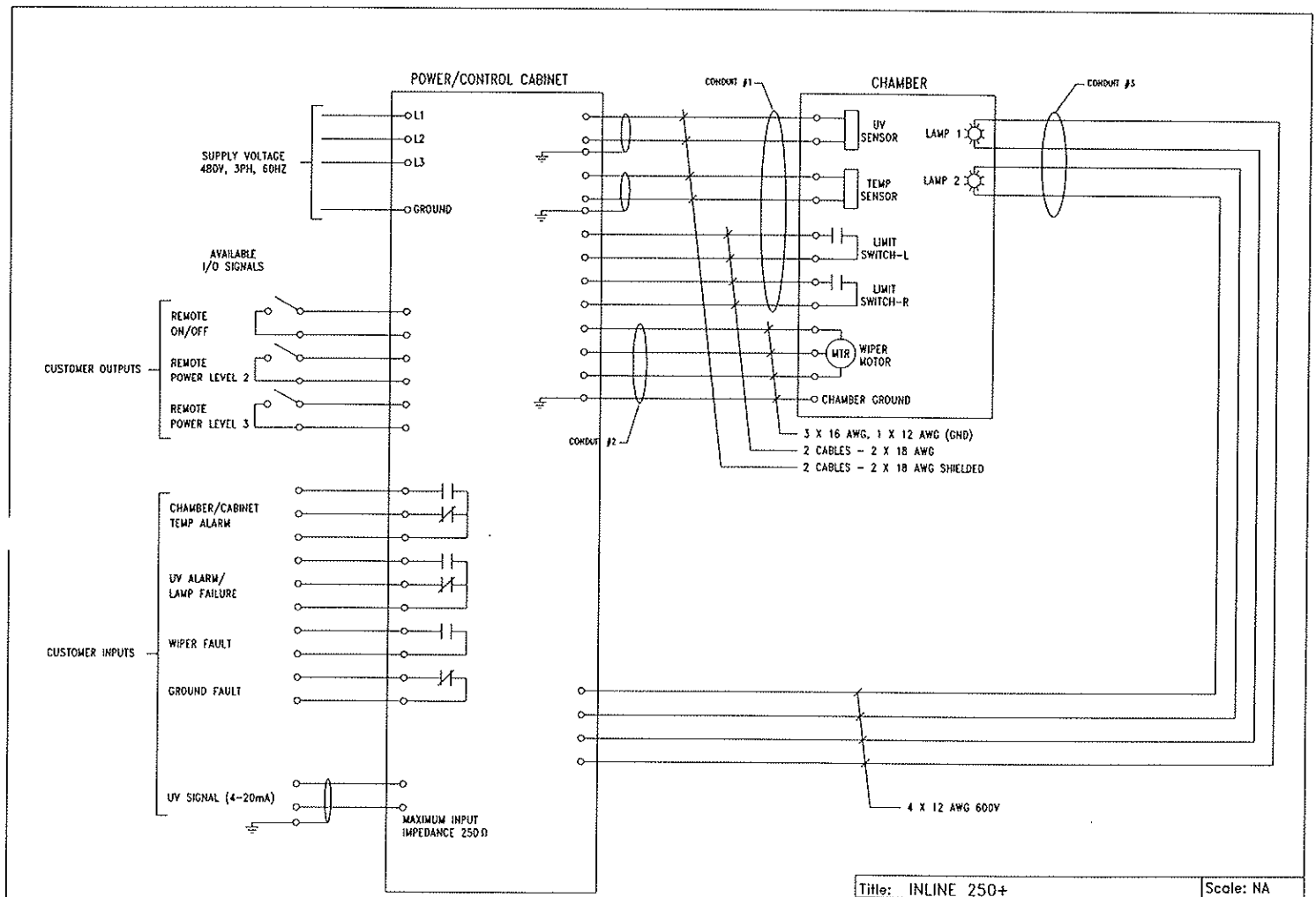
Standard Controls





NOTES:
1) DIMENSIONS IN INCHES [MILLIMETERS].
2) 30" FRONT CLEARANCE REQUIRED FOR SERVICE.
3) 12" SIDE CLEARANCE RECOMMENDED FOR AIR FLOW.

Title: INLINE 250+		Scale: NA
POWER AND CONTROL CABINET LAYOUT		Page 1 of 1
AQUIONICS A HALMA GROUP COMPANY	Drawn: GCK	Date: 3/15/04
	Appd: PJB	Date: 3/15/04
	Mat.	Rev. A
	Dwg. No: CLIN400+	



Title: INLINE 250+		Scale: NA
FIELD WIRING DIAGRAM		Page 1 of 1
	Drawn: PJB	Date: 5/13/04
AQUIONICS A HALMA GROUP COMPANY	Appd: MJG	Date: 5/13/04
	Mat.	Rev. B
	Dwg. No: FWIN400+	

Exhibit F

Summary of Discharge Activities

EXHIBIT F – SUMMARY OF DISCHARGE ACTIVITIES

Effluent from the interim WWTP will be used to irrigate the golf course located within the development. When the golf course irrigation system is at capacity, effluent will be discharged to Thirteen Mile Wash, approximately 850 feet west of the plant site. Thirteen Mile Wash is a tributary of Sacramento Wash. This point will be discharge point 001. Rhodes has submitted an AZPDES permit application to ADEQ for this discharge point and the permit is under review at this time.

It is anticipated that effluent from the plant will be discharged to Thirteen Mile Wash for an equivalent of 20 days during the course of a calendar year. Typically, golf course irrigation demands will exceed the amount of effluent produced by the interim WWTP. During precipitation events, however, the capacity of the golf course irrigation system may reach 100% saturation. This means that effluent cannot be delivered to the golf course and must be discharged to Thirteen Mile Wash.

Rhodes is requesting an AZPDES permit allowance for full plant capacity, or 240,000 gpd, for 20 full days worth of flow. This would provide for an annual discharge of 4.8 million gallons of Class A+ effluent to Thirteen Mile Wash during a full year of build out operation of the interim WWTP. Actual discharges during the anticipated plant life (16 months or less) will be significantly less. The WWTP's effluent quantity will start at virtually no flow and grow as the development grows. Assuming a steady rate of growth over the 16 month period and a prorated number of days of discharge over the same period, a more realistic discharge quantity will be 120,000 gpd of flow for 27 days of discharge. This will provide a total of 3.2 million gallons of Class A+ effluent to Thirteen Mile Wash over the life of the interim WWTP.

Exhibit G

BADCT Statement

EXHIBIT G – BADCT STATEMENT

Part and Parcel of the APP process is to demonstrate that the technology used to treat wastewater is proven technology for the application and that the people responsible for the design, construction and operation of the WWTP are qualified to perform their respective tasks. Per AAC R18-9-A202, Part A.5.e., if it can be demonstrated that the designer, contractor and operator are proficient in the proposed treatment technology under AAC R18-9-A202, Part B, a full BADCT demonstration is not required. An underlying assumption in this alternative BADCT demonstration is that the technology proposed for the plant has already been approved by ADEQ as BADCT technology for prior use in the state.

The qualifications of the design engineer are detailed in Exhibit Q. Mr. DiFrancisco has had firsthand experience with membrane treatment systems at Anthem, Arizona and has reviewed the process technology in place in Chino Valley, Arizona. In addition, Mr. DiFrancisco will work closely with Enviroquip/Kubota to verify that process calculations are accurate and appropriate for the Golden Valley Ranch interim WWTP.

The qualifications of the system operator are detailed in Exhibit R. Mr. Jones is a certified Grade 3 wastewater treatment operator in Arizona and has had firsthand experience with membrane systems at Anthem, Arizona. Mr. Jones will be involved in both the design and construction of the WWTP, thus gaining valuable insight into the system well before it is placed on-line.

The construction contractor has not been selected at this time. However, Rhodes is in a position to pre-qualify contractors based on their experience with construction of small WWTPs and will be able to select a qualified contractor while maintaining an atmosphere of allowing the market forces to dictate project cost.

Rhodes is proposing to use the Enviroquip/Kubota membrane treatment system for biological/filtration tertiary treatment, followed by a UV disinfection system to provide Class A+ effluent. This system mirrors the Class A+ system in service in Chino Valley, Arizona. In addition, Rhodes is enforcing a Class A+ performance guarantee on the project and both Enviroquip/Kubota and Stanley will perform independent process treatment calculations to verify that Class A+ effluent will be attained.

It is Rhodes' understanding that the BADCT provision of the APP is fulfilled by the design, construction and operating team proposed and by the use of the Enviroquip/Kubota membrane technology, which is already proven in the state of Arizona. In addition, it is Rhodes' understanding that for a plant of this size (less than 250,000 gpd buildout capacity), the design report is the equivalent of the BADCT demonstration. With this information provided in the application, it appears that this applciation is in compliance with BADCT requirements.

Exhibit H

AQWS, Ambient Groundwater and DIA Statement

EXHIBIT H – AQWS, AMBIENT GROUNDWATER AND DIA STATEMENT

The APP application process requires that the applicant provide information concerning the following technical items concerning hydrogeology of the site:

1. Aquifer Water Quality Standard (AQWS) Demonstration.
2. Ambient Groundwater Report.
3. Discharge Impact Area Map/Criteria.

One of the underlying considerations in these evaluations is the long term health of the aquifer in the area of discharge. Rhodes proposes that the effluent from the Golden Valley Ranch WWTP will not pose any long term negative impacts to the aquifer, and cites the following factors for this proposal:

1. The effluent from the Golden Valley Ranch interim WWTP is Class A+, used almost exclusively for golf course irrigation. The discharge location of the effluent is a lined golf course lake, where it will blend with the remainder of the lake water prior to use as irrigation water. Much of the water will be taken up by the golf course turf, and what does seep into the vadose zone will be drinking quality water.
2. The WWTP will be interim, with an expected life of 16 months or less. The total amount of anticipated discharge to Thirteen Mile Wash is approximately 3.2 million gallons of Class A+ effluent over the course of 16 months. Of this amount, it is questionable that any of the effluent makes it through the vadose zone to the aquifer because the discharges are intermittent in nature, which does not allow for water pressure to build up and force water down in to the aquifer. That water which does make it to the aquifer will have no negative impact to the aquifer because of the water quality of the effluent.
3. The reporting requirements of the WWTP at startup must prove that consistent Class A+ effluent is being produced. These reporting requirements act as a check to verify that Class A+ effluent is being discharged to the golf course or Thirteen Mile Wash, and this helps protect the aquifer water quality.

When the factors noted above are taken into account, it is clear that the Golden Valley Ranch interim WWTP does not pose any long term negative impact to the aquifer. Per AAC R18-9-202 A.8., ADEQ has the option of foregoing the hydrogeological data requirements of the APP regulations if it can be demonstrated that the WWTP has negligible impact on the local hydrogeology. With the information supplied above that demonstrates the negligible impact to the local hydrogeology, Rhodes requests that ADEQ forego the reporting requirements of the AQWS, ambient groundwater report, and discharge impact area map.

Exhibit I

Contingency Plan

Contingency Plan

Golden Valley Ranch Interim Wastewater Treatment Plant

January 2006

Stanley Consultants INC.
A Stanley Group Company
Engineering, Environmental and Construction Services - Worldwide

Table of Contents

Introduction

This document is prepared pursuant to Arizona Administrative Code (A.A.C.) R18-9-A204 with respect to the requisite Contingency Plan as well as available aspects of contingency operations per A.A.C. R18-9-B202 (A)(5).

This document is for use during emergency situations, equipment failures or any other situation that might cause the limits of the WWTP to be exceeded or otherwise cause a public health hazard. It is to be understood that this document cannot and does not purport to cover every possible aspect of the WWTP contingency operation or emergency situation.

In the event one or more emergency situations arise, this Contingency Plan document will provide guidelines for emergency measures to be followed by all personnel. In addition to emergency contacts and notifications, this document includes sections relating to the areas of the treatment process. Each of these sections provides a discussion of emergency measures for that area and any relationship to other areas of the process that might be affected by measures taken.

General Plan of Response to Violations of Permit Conditions

The Perkins Mountain Utilities Company (PMUC) will provide immediate response to any permit violation, whether it is discovered during sampling operations or if it is an emergency spill or other plant malfunction. For sampling violations, the following general procedure will be followed:

1. Immediately retest the parameter(s) that is in violation.

2. If the parameter involves compounds that pose an immediate threat to health and safety of the citizens of Mohave County, implement immediate containment or other measures to insure that the safety of the population is insured.

3. If the parameter does not pose an immediate threat to health and safety, take a proactive, but measured, approach to implementing process improvements.

4. Notify affected customers and the public of the violation as soon as possible for immediate threats to public health and safety, and within reporting requirements for non-immediate threats to public health and safety.

5. Notify ADEQ of the violation as soon as possible for immediate threats to public health and safety, and within reporting requirements for non-immediate threats to public health and safety.

6. Determine the cause of the violation and institute appropriate measures to bring the system back into compliance.

For emergency spills and other plant malfunctions, the following general procedure will be followed:

1. The WWTP's monitoring system will detect plant malfunctions and notify emergency response personnel immediately.
2. Emergency response personnel will respond to the site to investigate. In some cases such as high water level in the influent pump station, the operator will be able to turn pumps on and off remotely.
3. Emergency response personnel will assess the situation and call for aid if required.
4. Notify affected customers and the public of the violation as soon as possible for immediate threats to public health and safety, and within reporting requirements for non-immediate threats to public health and safety.
5. Notify ADEQ of the violation as soon as possible for immediate threats to public health and safety, and within reporting requirements for non-immediate threats to public health and safety.
6. Determine the cause of the plant malfunction and institute appropriate measures to bring the system back into proper operational mode.

Required Plan for Response to Violations of AWQS at the POC

The APP will be approved with stipulations concerning water quality compliance levels for this plant. These levels coincide with insuring that the aquifer water quality is not compromised. For the Golden Valley Ranch Interim WWTP, the following stipulations are anticipated:

1. Fecal Coliform limits
2. 5-day BOD and TSS limits.
3. Total Nitrogen limits.
4. Metals and VOC limits.

Rhodes Homes is providing a WWTP to PMUC that should meet and exceed all requirements of the APP for these constituents. In the unlikely event of a violation, however, PMUC will respond as follows.

Condition 1 - Fecal Coliform levels exceed permitted limits.

1. Increase level of disinfection.
2. Take verification sample within 24 hours of receiving test results that exceed permit limits.
3. Notify ADEQ.
4. Notify the Emergency Contact List contained herein.
5. Increase frequency of testing for fecal coliform to weekly for next 4 weeks to verify that increase in disinfection has established a consistent acceptable result.
6. Inspect and monitor and/or repair disinfection system to ensure proper operation of disinfection system.

Condition 2 - Five-Day Biochemical Oxygen Demand (BOD5) and/or Total Suspended Solids (TSS) levels exceed permitted limits.

1. Retest influent and effluent BOD and TSS within 24 hours.
2. Notify ADEQ.
3. Notify the Emergency Contact List contained herein.
4. Make adjustments to the wastewater treatment plant processes needed to improve the quality of effluent.
5. If influent BOD and TSS exceed the normal levels, Identify source of high BOD and TSS and eliminate.
6. Increase testing to verify treatment adjustments and/or elimination of sources of High BOD and TSS have re-established consistent and acceptable results.

Condition 3 - Total Nitrogen levels exceed permitted limits.

1. Retest influent and effluent Nitrogen levels within 24 hours.
2. Notify ADEQ
3. Notify the Emergency Contact List contained herein.
4. Make adjustments to the wastewater treatment plant processes needed to improve the Quality of effluent.
5. Increase testing to verify plant adjustments have established consistent and acceptable results.

Condition 4 - Metals and VOC levels exceed permitted limits.

1. Retest influent and effluent Metal and VOC levels within 24 hours to ensure accurate test results.
2. Notify ADEQ.
3. Notify the Emergency Contact List contained herein.
4. Determine possible sources of elevated Metal and VOC contaminants, contact responsible party, and eliminate source.
5. Increase testing to verify elimination of potential sources of elevated metals and VOC contaminants.

These four areas listed above are typical permit parameters for Class A+ WWTPs. If ADEQ places different or additional permit constraints on the WWTP, the General Plan will be modified to reflect an appropriate response to these constraints.

Response to Exceeding of a Discharge Monitoring Alert Level, if Proposed

If a discharge monitoring alert level is exceeded, the following general procedure will be followed:

1. A retest of the exceeded parameter will be conducted within 24 hours.
2. If the alert level exceedence is confirmed, contact ADEQ. If the alert level exceedence is not confirmed, take daily samples for three (3) successive days.
3. If alert level exceedence is confirmed in any samples, contact ADEQ.
4. Notify emergency contact list contained herein.
5. Investigate cause of exceedence and remedy the situation.
6. Test to verify the remedy achieves consistent and acceptable results.

7. If all levels under No. 3 do not confirm alert level exceedence, submit all test reports to ADEQ within 7 days and note that alert level exceedence was a "false positive".

Response to Exceeding Groundwater Monitoring Alert Level, if Proposed

If a groundwater monitoring alert level is exceeded, the following general procedure will be followed:

1. A retest of the exceeded parameter will be conducted within 24 hours.
2. If the alert level exceedence is confirmed, contact ADEQ. If the alert level exceedence is not confirmed, take daily samples for three (3) successive days.
3. If alert level exceedence is confirmed in any samples, contact ADEQ.
4. Notify emergency contact list contained herein.
5. Investigate cause of exceedence and remedy the situation.
6. Test to verify the remedy achieves consistent and acceptable results.
7. If all levels under No. 3 do not confirm alert level exceedence, submit all test reports to ADEQ within 7 days and note that alert level exceedence was a "false positive".

Response to Exceeding a Discharge Limitation or Limits

See the section "Plan for Response to Violations of AQWS at the POC".

Plan for Response to Imminent and Substantial Endangerment to the Public Health and Environment

The following Emergency Response plan shall be implemented if an imminent and substantial endangerment to the public health and environment is a concern.

A. Emergency Contacts:

1. Emergency Response Coordinator - Ray Jones (623-341-4771)

2. HAZMAT Team – Golden Valley Fire Department, Emergency 911, Non-Emergency (928-565-3479)

B. Responsibilities:

1. **Emergency Response Coordinator**
   (a) Ensure Emergency Response Plan is implemented.

   (b) Ensure all parties that could be affected by a spill or incident are notified immediately.

   (c) Assist HAZMAT Team however possible.

   (d) Coordinate all cleanup efforts

2. Plant Operators/Staff

(a) Ensure Safety of all Personnel and people within imminent danger area.
(b) Notify Emergency Response Coordinator.
(c) If spill or release is a toxic or Hazardous Material Notify HAZMAT Team Coordinator.
(d) Secure immediate exposure area and prevent unauthorized access.
(e) Wait for Fire Dept/HAZMAT Team to arrive on the scene.
(f) Turn Control of incident control over to Fire Dept/HAZMAT incident commander.
(g) Provide as much information to HAZMAT team as possible.
    1. Location of spill or release
    2. Probable size of spill or release if known.
    3. Possible causes of spill or release if known
    4. Location of Plant safety equipment.
    5. Location of Electrical disconnects and Controls
    6. Possible causes of spill or release if known
    7. Location of Plant safety equipment.
    8. Location of Electrical disconnects and Controls
    9. Provide support for cleanup operations.

3. Golden Valley Fire Department/HAZMAT Team

(a) Arrive at scene and take control of incident assessment and control.
(b) Set up Safety Zones and coordinate evacuation procedures as necessary
(c) Contain and if possible stop source of spill or release.
(d) Provide support for clean-up operations.

4. Cleanup and Recovery Team

The Cleanup and recovery team may or may not be comprised of Golden Valley Ranch WWTP personnel, Golden Valley Fire Department personnel, or a private Contractor specializing in Cleanup and recovery operations.

(a) Cleanup and dispose of hazardous materials as required by federal, state and local regulations.
(b) Ensure safety of public and plant staff during cleanup operations.
(c) Repair and/or replace faulty and/or damaged equipment.

C. Available Equipment

PMUC will coordinate with the emergency responders (Mohave County Sheriff and Golden Valley Fire Department) to determine what emergency response equipment will be available on site. The current plan calls for the following equipment to be available, either on-site or through "quick response" rental agreements:

1. Self contained breathing apparatus (SCUBA) – 2 sets
2. Emergency eyewash – 2 locations
3. submersible pumps for emergency pumping (rental contract, deployable within 6 hours)

4. bulldozers/heavy construction equipment (rental contract, deployable within 12 hours)
5. Emergency generator (rental contract, as backup to the on-site generator – deployable within 4 hours)

D. Upon completion of cleanup and repair operations plant operators shall evaluate cause of incident and take corrective measures to prevent future incidents from occurring.

Response Plan for Unauthorized Discharges/Releases

In the event of a spill that may cause the exceedance of AQL or might cause imminent and substantial endangerment to public health or the environment (and after the spill has been contained and any emergency situations have been resolved) the Senior WWTP Operator shall submit a written report to ADEQ that includes the following:

1. A description of the spill or accidental discharge.
2. The date(s) and time(s) of the spill or accidental discharge.
3. Action taken by the Emergency Response Team to mitigate the effects of the spill and the Cleanup procedures involved.
4. Cause of the spill and the steps taken to prevent further spills or incidents from occurring.
5. Any additional monitoring and/or sampling taken because of the incident.
6. Any malfunctions or failure of pollution control equipment and/or devices and the steps taken to repair the listed equipment.

In the event of any accidental spill or unauthorized discharge of suspected hazardous or toxic materials on the facility site and related area shall be promptly isolated and attempts to identify the material shall be made. Information on persons that may have been exposed to the material will be recorded. If the material is identified to be in the category of acceptable, the operator shall dispose of the material in an appropriate landfill. Otherwise, if the material is not identified with certainty, or is identified as being in the category of unacceptable waste, a qualified contractor shall remove and dispose of the material according to applicable federal, state and local regulations.

24 Hour Emergency Response Plan

This site is not staffed for 24 hour a day, 7 day operation. As such, the typical operational mode will be one of regular site visits for review of WWTP performance, testing as required, and maintenance of facilities. When the site is not occupied, coverage will be provided 24/7 by the local operator and the plant supervisor via the autodialer/phone system. The autodialer will send any alarm signal to both persons to insure immediate response to any alarm that is generated. Initial response is then as outlined in the various response scenarios as outlined within this document.

Emergency Contact List

At least one of the following individuals listed in the chain of command for reporting of an emergency situation will be available at all times:

1. Senior WWTP Operator -	Ray Jones Phone (623) 341-4771
2. Fire Department -	Golden Valley Fire Department Emergency 911 Non-Emergency: (928) 565-3479
3. Police Department -	Mohave County Sheriff Emergency 911 Non-Emergency: (928) 753-2141, or 1-800-522-4312
4. Emergency Response – Coordinator	Ray Jones Phone (623) 341-4771
5. HAZMAT Team –	Golden Valley Fire Department Emergency 911 Non-Emergency: (928) 565-3479

It will be the responsibility of the above named personnel to work in a safe manner, following all safety policies and to provide for the safety of the public, at all times.

Exhibit J

Hydrogeologic Report Statement

EXHIBIT J – HYDROGEOLOGIC REPORT STATEMENT

The APP application process requires that the applicant provide information concerning the hydrogeology of the region, primarily to assess the potential near term and long term impacts that WWTP discharges can have to the aquifer in the area of discharge. AAC R18-9- A202 A.8 states that ADEQ has the right to waive the requirement for a hydrogeologic report if there is clear evidence that the WWTP in question does not pose any long term risk to the aquifer.

Rhodes proposes that the effluent from the Golden Valley Ranch WWTP poses no long term negative impacts to the aquifer, and cites the following factors for this proposition:

1. The effluent from the Golden Valley Ranch interim WWTP is Class A+, used almost exclusively for golf course irrigation. The discharge location of the effluent is a lined golf course lake, where it will blend with the remainder of the lake water prior to use as irrigation water. Much of the water will be taken up by the golf course turf, and what does seep into the vadose zone will be drinking quality water.

2. The WWTP will be interim, with an expected life of 16 months or less. The total amount of anticipated discharge to Thirteen Mile Wash is approximately 3.2 million gallons of Class A+ effluent over the course of 16 months. Of this amount, it is questionable that any of the effluent makes it through the vadose zone to the aquifer because the discharges are intermittent in nature, which does not allow for water pressure to build up and force water down in to the aquifer. That water which does make it to the aquifer will have no negative impact to the aquifer because of the water quality of the effluent.

3. The reporting requirements of the WWTP at startup must prove that consistent Class A+ effluent is being produced. These reporting requirements act as a check to verify that Class A+ effluent is being discharged to the golf course or Thirteen Mile Wash, and this helps protect the aquifer water quality.

These points were discussed at the APP pre-application meeting of November 30, 2005. ADEQ noted that these factors, along with the fact that the plant capacity is less than 250,000 gallons, allows for a different reporting standard for hydrogeologic data. ADEQ listed the seven (7) required items at the meeting. These items are reproduced below, along with their location in the application.

1. Site Plan (Exhibit D – there are no wells in close proximity to the site) with vicinity well inventory (Exhibit C)
2. Indication of groundwater flow direction (Exhibits C and J)

3. Latitude and longitude of the points of compliance (APP application item 6)
4. Location of closest well (Exhibit C) with well technical information if well is within ½ mile of WWTP (there are no wells within ½ mile of plant)
5. Depth to groundwater (Exhibit J)
6. Description of hydrogeologic setting (Exhibit J)
7. FEMA 100 year flood map (Exhibit J) showing that WWTP is outside of flood plain (Exhibit J) (The attached map is a comprehensive FEMA map overlay within the Golden Valley Ranch development, which shows that the interim WWTP is outside of any delineated 100 year flood plain)

The following is excerpted from the Errol Montgomery & Associates groundwater report for Golden Valley Ranch.

> *The Sacramento basin is a graben developed between the major, gently east-dipping Mockingbird Mine fault on the west and the west-dipping Cerbat Mountains fault on the east. The basin is filled with a thick sequence of alluvial deposits of Tertiary to Quarternary age that overlies fractured granitic, metamorphic, and volcanic bedrock units, and is interbedded with younger volcanic rocks at some locations. The bedrock units form the basal and lateral boundaries of the basin and yield small quantities of groundwater to wells, except where abundantly fractured. The basin-fill alluvial deposits comprise the principal groundwater aquifer; thickness of these deposits ranges from a featheredge at the mountain fronts to possibly more than 4,000 feet in the north part of the basin. The volume of groundwater in storage in the principal Sacramento Valley aquifer system far exceeds the annual volume of recharge and discharge of groundwater in the basin.*
>
> *The alluvial basin-fill deposits in Sacramento Valley have been divided into three major units: younger alluvium; intermediate alluvium; and older alluvium (Gillespie and Bentley, 1971). The older alluvium unit is the principal aquifer for virtually all of the existing production water wells in the non-bedrock areas of Sacramento Valley. The lower part of the unit lies below groundwater table and reported yield to wells ranges from a few gallons per minute (gpm) to more than 2,000 gpm; most reported yields are small due chiefly to the pump capacity selected for domestic or stock use and are not representative for production capacity of the unit. At well GV-1 [B(21-18)34dba], located immediately north of the Property, depth to non-pumping groundwater level in the older alluvium unit was about 765 feet below land surface (bls) and sustainable yield of the well exceeded the maximum capacity of the test pump, which was about 2,500 gpm. Well records and geophysical data for the basin demonstrate that the principal aquifer in Sacramento Valley is extensive, thick, and contiguous throughout most of the basin, and provides a good source of adequate groundwater supply to the proposed Rhodes Homes development. Data*

indicate that depth to bedrock and thickness of the older alluvium unit increase from east to west across the Property and are maximum near the west boundary of the Property.

Groundwater in the older alluvium unit in the north part of Sacramento Valley generally moves from north to south in the same direction as ephemeral surface water flow in Sacramento Wash. Groundwater and surface water flow exits the basin to the Colorado River valley near Topock, Arizona; groundwater also leaves the basin by pumping from wells. Altitude of groundwater level in spring 1990 ranged from 1,800 feet above mean sea level (msl) north of State Highway 68 to 1,500 feet msl at Yucca (Rascona, 1991). Average hydraulic gradient of groundwater movement across the Property at that time was about 0.002, or 10.4 feet per mile. Altitude of groundwater level measured in the older alluvium unit was about 1,794 feet msl in June 2005 at well GV-1. Results of drilling for well GV-1 suggest that unconfined aquifer conditions occur in the Property area.

The current average depth to groundwater at the Property is estimated to be about 755 bls. Therefore, it is assumed that the available groundwater level drawdown above the 1,200-foot Arizona Department of Water Resources (ADWR) water adequacy criterion is 445 feet.